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The systematics and ecology of new genera and species of primitive Stygnocorini from South Africa, Madagascar and Tasmania (Hemiptera: Lygaeidae)[1]

by

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SYNOPSIS

Three new genera and seven new species of primitive stygnocorine Lygaeidae are described. One genus is represented by four South African and one Madagascar species. A second genus by a single species from Table Mountain, Cape Town, and a third by a single species from Tasmania. The relationships of these genera to others of the tribe is discussed. The position of the Stygnocorini within the Rhyparochrominae is analysed and a key included to the world genera. *Paracnemodus* Slater is removed from the Myodochini and placed in the Stygnocorini. The zoogeographic implications of the distribution of these new genera is discussed relative to the distribution of other members of the tribe and to past climatic conditions in southern Africa. Keys are included to all the species. Descriptions of the nymphs and eggs as well as habitat and ecological information is given for several of the South African species.

The tribe Stygnocorini Gulde is of great importance to an understanding of the phylogeny and evolution of the rhyparochromine Lygaeidae. As the most generalized of the tribes whose nymphs possess a Y-suture, it is probably ancestral to such varied taxa as the Rhyparochromini, Ozophorini, Drymini, Udeocorini and Myodochini. Unfortunately the limits of the tribe have been subject to considerable differences in interpretation in recent years. This has been discussed by Slater (1964) and extensively by Sweet (1967).

One disturbing feature of this relatively primitive tribe in the past has been the apparently anomalous geographical distribution presented by its previously known genera. Six of these were largely centred in the western Palearctic Region, with one isolated genus, *Margareta*, in New Zealand. (*Arrianus* Distant from India previously placed in the Stygnocorini is a junior synonym of *Plinthisus* Stephens NEW SYNONYMY. *Bathydema* Uhler from the West Indies and Central America is almost certainly a member of the Antillocorini. [See Sweet, 1967, for discussion.]) It is therefore particularly important that we are now able to add to the tribe three South African genera and a Tasmanian genus which is closely related to one of the South African genera. One species of an otherwise South African genus also occurs in Madagascar. These genera not only greatly modify the zoogeographic picture, but probably represent stygnocorine stocks similar to that which gave rise to the highly modified Ozophorini.

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[1] This is the first of a proposed series of papers dealing with various aspects of the systematics, ecology and distribution of the Lygaeidae of South Africa. In large part these papers will represent the results of field-work accomplished by both of us in the Republic of South Africa from September 1967 to June 1968. This work was supported by grants in aid from the National Science Foundation, U.S.A.

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The genus *Paracnemodus* described by Slater (1964) from a single specimen from South Africa and placed in the tribe Myodochini is actually a member of the Stygnocorini despite its close superficial resemblance to the myodochine genus *Cnemodus* which has a similar elongate body, porrect head and rounded pronotal margins. Slater's statement that spiracles 2, 3, and 4 are dorsal is in error; the spiracles are hidden under the epipleura.

The new genera and species described below clearly fall into the Stygnocorini as defined by Sweet (1967) by possessing the following characters: abdominal spiracles ventral, posterior pair of trichobothria of abdominal segment five closer to spiracle than to posterior margin of segment; inner laterotergites 3–6 present on connexivum; wing venation generalized with hamus and intervannals (secondary veins) present; nymphs red with abdominal Y-suture and large evaporative plates present around abdominal scent gland orifices; eggs relatively short, 'cucumber-shaped' with chorion smooth.

In general habitus the genera restricted to the southern hemisphere differ considerably from Palearctic genera in being relatively elongate insects with long appendages, porrect heads, and with bluntly carinate to rounded pronotal margins. In these features this group of genera resembles the Ozophorini and the Phasmosomini as well as certain long-legged genera in tribes with dorsal spiracles. This resemblance to the Ozophorini is enhanced by the V-shaped union of the bucculae behind the labium (fig. 7), the linear, posteriorly directed callus above the metathoracic scent gland orifice (fig. 9); and, in *Notiocola*, n.g. by the presence of longitudinal grooves on the vertex. With such a complex of characters it would seem to be entirely reasonable to consider these Austral Stygnocorini to represent the stock that is ancestral to the Ozophorini and perhaps the Phasmosomini. However, it should be noted that the genitalia appear to be too highly modified to permit these particular genera to be directly ancestral to the Ozophorini. Moreover, *Notiocola*, the genus most ozophorine in habitus, is in the composition of its genitalia most closely related to *Capenicola*, n.g. which is the least ozophorine in appearance of any of the Austral genera.

The genus *Lasiosomus* bridges the gap between the Austral and Palearctic groups both geographically and morphologically. *Lasiosomus* was once thought to be endemic in the western Palearctic but is now known to range through the Ethiopian region, especially in the uplands, and is richly represented in South Africa. Several of the Cape species groups may represent distinct genera and we shall treat this complex in a future paper. The diversity within *Lasiosomus* is indicated by the variation of the head shape from declivent to porrect; the lateral pronotal margins from rounded to carinate; investiture nude to hirsute; head trichobothria absent or present; and the intersegmental suture between sterna 4 and 5 either nearly straight and reaching the connexival margin or strongly curved and ending at the trichobothrial furrow. In this variation *Lasiosomus* overlaps the two 'groups' of Stygnocorini.

Sweet (1967) considered a compact body with short appendages and a declivent head, such as is found among the Palearctic Stygnocorini, to be a primitive or plesiomorphic complex of characters, in part because such a form is characteristic of the primitive Plinthisini. He considered an elongate body form with long appendages and a porrect head to be an advanced or apomorphic set of characters, in part because these characterize the Ozophorini which are derivable from Stygnocorini on other characters. The other tribes with ventral spiracles, the Lethaeini, Antillocorini, Drymini and the Targaremini, have the

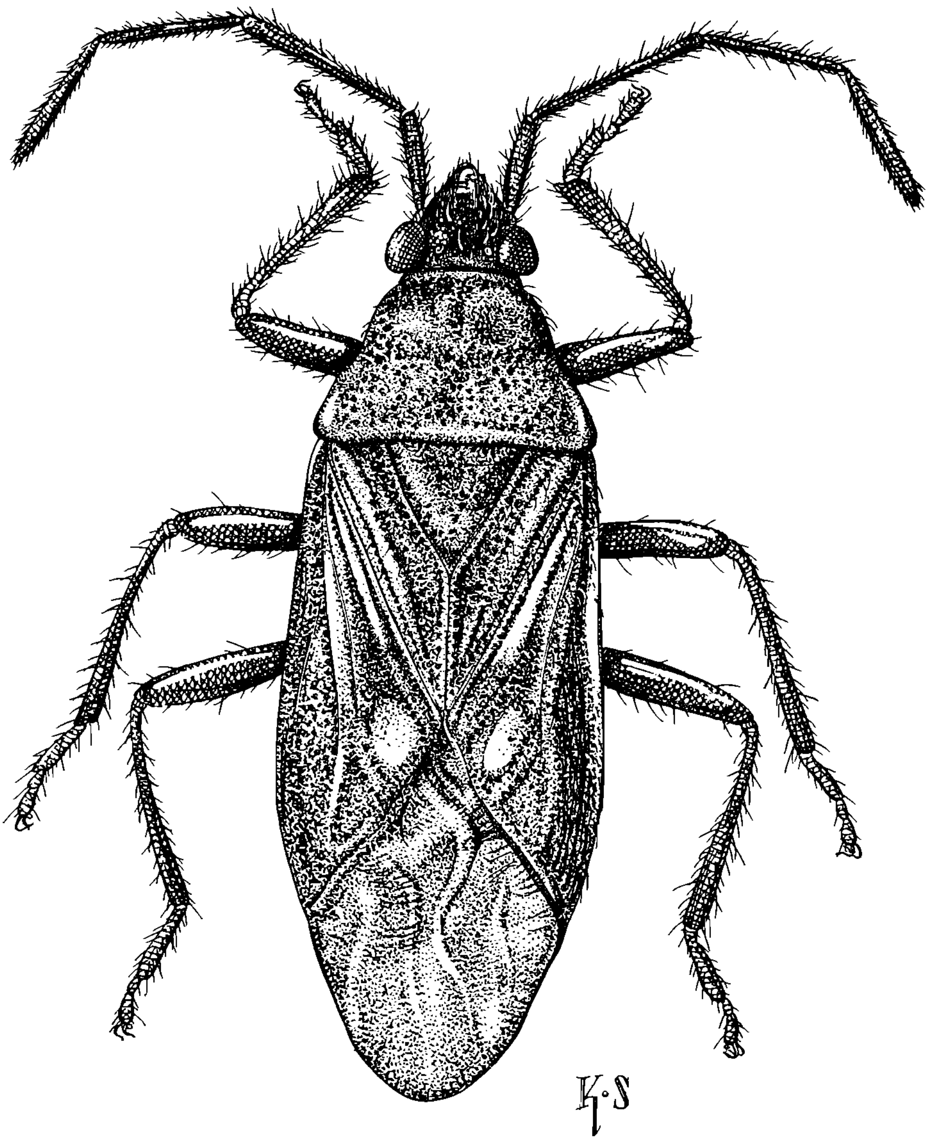

Fig. 1. Dorsal view of *Notiocola emlembei* n. sp.

suggested plesiomorphic body form and moreover, among the tribes with dorsal spiracles, a similar character transformation series seems to be present with the long-legged elongate forms representing the advanced condition.

This progression from taxa whose members possess short legs to taxa whose members possess elongated legs appears to be definitely the case among the Myodochini. However, the relict Stygnocorini genera of the southern hemisphere in general have relatively elongate body forms and porrect heads. Moreover, the Ozophorini are tropicopolitan in distribution with the more primitive genera in the Neotropics which would indicate at least an old dispersal for this taxon. This zoogeographic picture seems to indicate that the elongate stygnocorines are either more primitive and dispersed earlier, or the elongate forms had better dispersal powers. More collecting in other southern hemisphere areas may help resolve this question as the Rhyparochrominae are very poorly collected throughout most of the southern hemisphere.

The significance of the endemic Stygnocorini of South Africa is greatly increased when it is realized that these genera are all components of the very old stable Cape Macchia floral region. This remarkable floral assemblage is isolated in extreme southern Africa extending from the south-west Cape eastward to Algoa Bay with outliers at higher elevations northward and eastward especially along the great Drakensberg escarpment. *Paracnemodus* is entirely confined to the Cape Macchia. *Capenicola*, n.g. is at present known only from Table Mountain, near Cape Town. *Notiocola* has a wider distribution, occurring along the escarpment as well as in the south-west Cape, but always in association with Cape vegetation in damp cool habitats. Of considerable significance is the presence of at least one species of *Notiocola* in Madagascar at high elevations. Also characteristic of the Cape floral region is the abundance and diversity of species of *Lasiosomus*. While several groups of *Lasiosomus* occur elsewhere in Africa, only in the Cape are all the known 'species groups' present. As many old invertebrate taxa are endemic to the Cape floral region, the association of these insects with this vegetation strongly supports the theory of the antiquity and generalized condition of the Cape Stygnocorini.

Furthermore, the presence of a new genus very closely related to *Notiocola* in Tasmania and another of these primitive stygnocorines (*Margareta*) in New Zealand indicates strongly that we are dealing with an ancient south temperate complex. The significance of this distribution to early continental relations is evident.

While the great majority of Rhyparochrominae have the suture between sterna 4 and 5 curving cephalad and ending at the trichobothrial furrow, in a number of genera the suture attains the lateral connexival margin. Such a complete suture is found in both Palearctic and Austral stygnocorine genera: *Acompus*, *Hyalochilus*, some species of *Lasiosomus*, *Paracnemodus*, *Notiocola*, *Capenicola* and *Tasmanicola truganinae*. Among the other tribes the complete suture is found in *Phasmosomus* (Phasmosomini), *Prosomoeus* (Ozophorini), *Gastrodes* (Drymini), *Nocellochromus* (Rhyparochromini), *Diomphalus* (Gonianotini), *Astemmoplitus* (Udeocorini), *Plinthisus* (Plinthisini) and among most Cleradini where the suture, although strongly curved, attains the lateral margin (Sweet, 1967). In most of these genera the suture bends forward at least slightly in the area of the trichobothrial furrow (figs. 33–39). Given this character distribution it seems reasonable that while the fusion of sterna 4 and 5 is probably monophyletic in the Rhyparochrominae, the strong forward curvature and lateral obliteration of the 4–5 suture may be of polyphyletic origin in various tribes of the subfamily. After the fusion of sterna 4 and 5, selection pressure for a more effective distribution of the abdominal trichobothria could then promote the anterior shift of the trichobothria of segment 5. Also this movement could simultaneously give rise to the various stable trichobothrial patterns found on segment 5. The great length of the trichobothria in the Rhyparochrominae attests to their biological importance, probably as contact receptors, much like oral vibrissae of mammals, which would be of great importance for these ground and litter inhabiting species (Sweet, 1964). The origin of the Y-suture must then antedate the trichobothrial shift since many genera possessing Y-sutures have complete sterna 4–5 sutures. If correct, this reconstruction emphasizes the primitive and central position of the Stygnocorini in rhyparochromine evolution.

KEY TO THE WORLD GENERA OF THE TRIBE STYGNOCORINI*

1. Abdominal spiracle 5 directly above posterior pair of trichobothria; suture between abdominal sterna 4 and 5 curving so far cephalad as to nearly completely obliterate the lateral portions of sternum 4 (fig. 34); metathoracic wing with intervannals (secondary veins) absent; membrane of macropter with only three veins evident; helicoid process in phallus modified into a ring sclerite (fig. 21) .. .. **Bathydema*** (sensu *socia* Uhler)

   Abdominal spiracle 5 distinctly anterior to trichobothria pair (except in *Capenicola*) (fig. 33); sternum 4 complete, not obliterated laterally by the curving suture between sterna 4 and 5; intervannals present; membrane in macropter with 4 or 5 veins present; helicoid process present as a coiled sclerite (figs. 19–20) or a sclerotized flap (figs. 15–16) 2

2. Dorsal margin of metathoracic scent gland orifice a cap or U-shaped projecting callus (fig. 8); bucculae meeting behind labium in a broad 'U' or blunt 'V-shaped' carina in posterior third of head (fig. 6); head *usually* declivent with antenniferous tubercles invisible from above; anterior lobe of pronotum *often* evenly punctate 3

   Dorsal margin of scent gland orifice a linear elongate and posteriorly produced callus (fig. 9); bucculae meeting behind labium in a narrow sharp 'V-shaped' carina in anterior half of head (fig. 7); head porrect with antenniferous tubercles visible from above; anterior lobe of pronotum largely impunctate 8

3. Pronotum with lateral margins bluntly carinate or rounded; anterior lobe of pronotum with largely impunctate calli; punctures of posterior lobe *often* farther apart than diameter of punctures .. .. **Lasiosomus**

   Pronotum with lateral margins acutely carinate, sometimes lamellate; anterior lobe of pronotum usually completely punctate; punctures of posterior lobe usually closer together than diameter of punctures 4

4. Suture between sterna 4 and 5 nearly straight, attaining connexival margin (figs. 35–39); outer laterotergite of abdominal segment 1 present as a strap-shaped sclerite; holding sclerites present in phallus (hs, fig. 10); dorsum nude with head trichobothria absent or very short and indistinct 5

   Suture between sterna 4 and 5 curving anteriorly, joining trichobothrial furrow, not attaining connexival margin (fig. 34); no outer laterotergite present on first abdominal segment; no holding sclerites in phallus; head trichobothria long, dorsum often densely pilose 6

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* The genus *Bathydema* is included in the key although as previously stated we believe it will prove to be a member of the tribe Antillocorini.

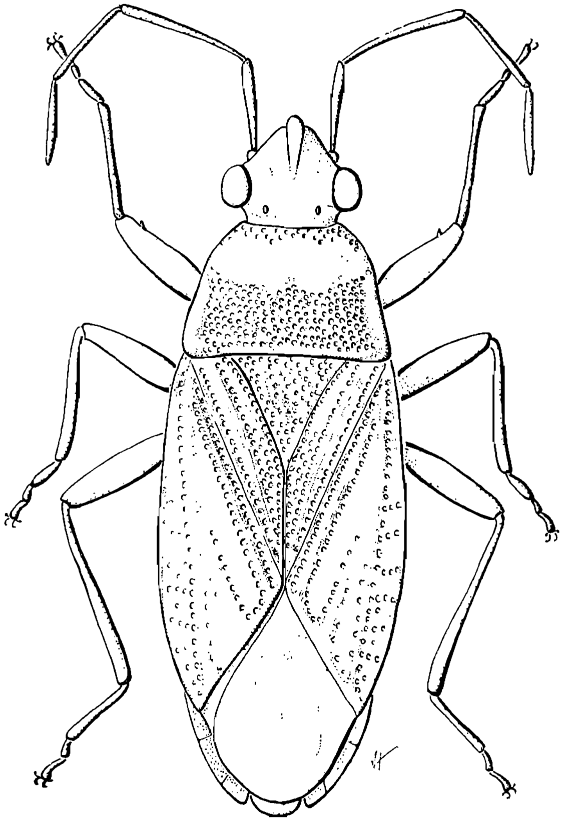

Fig. 3. Dorsal view of *Notiocola quathlamba* n. sp.

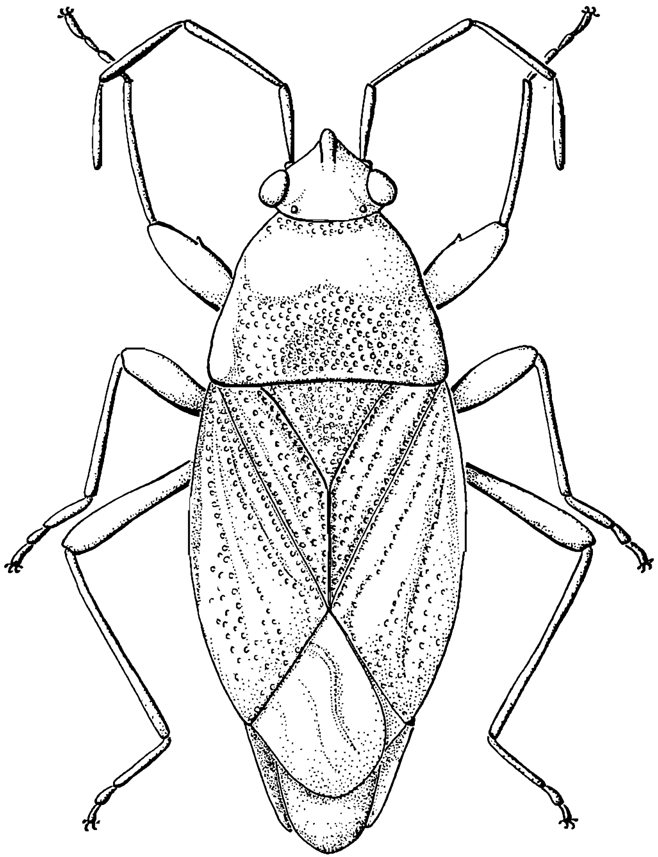

Fig. 2. Dorsal view of *Notiocola riebeecki* n. sp.

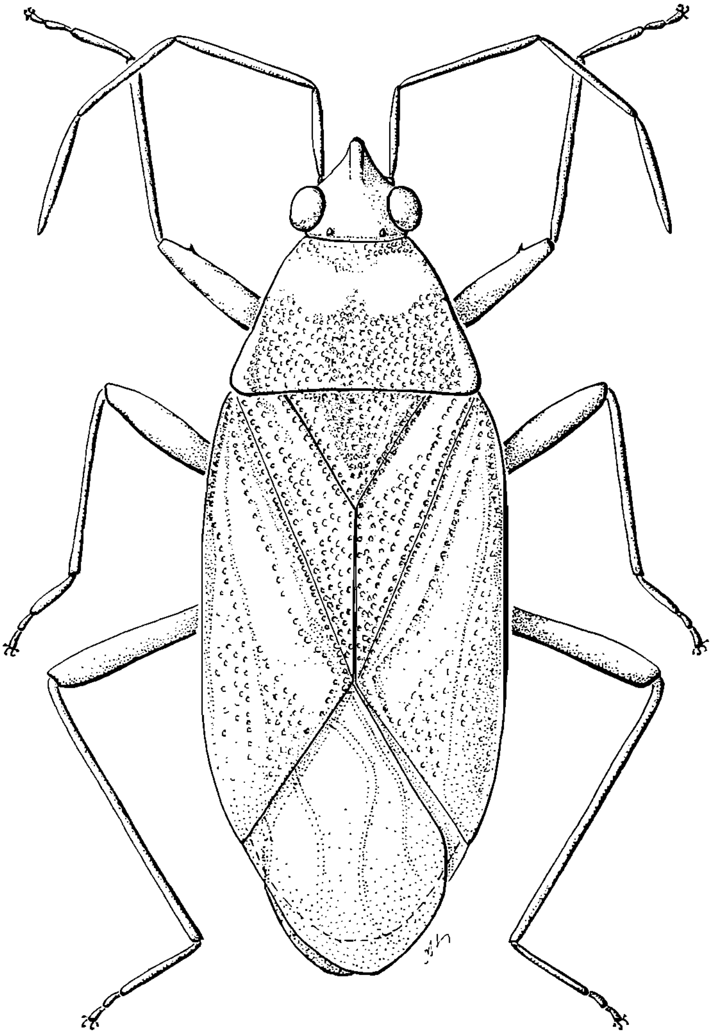

Fig. 4. Dorsal view of *Notiocola hutchinsoni* n. sp.

5. Lateral margins of pronotum and corium lamellately explanate; head trichobothria absent; pronotum conspicuously divided into dark anterior and light posterior lobes; membrane of hemelytra much exceeding abdomen.. .. .. **Hyalochilus**
   Pronotum and corium carinate laterally; head trichobothria short but present; pronotum unicolorous black; membrane only attaining apex of abdomen .. **Acompus**
6. Scutellum 1·4 times wider than long; total length less than 1·6* .. **Stygnocorisella**

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* All measurements given are in millimetres.

Length and width of scutellum subequal; total length greater than 2·5 (two rows of spines present on ventral surface of male fore femora) 7

7. Lateral margin of pronotum and corium narrowly explanate; spermathecal bulb with a narrow basal flange; abdominal spiracles 3 and 4 exposed .. .. **Esuridea**
Lateral margins of pronotum and corium carinate; spermathecal bulb without a flange; abdominal spiracles 3 and 4 covered by epipleura .. .. .. **Stygnocoris**

8. Three spines present on ventral surface of fore femora; suture between sterna 4 and 5 curving strongly cephalad, joining the trichobothria furrow and not attaining lateral margin of connexivum; head and pronotum densely pilose with long hairs; no holding sclerites in aedeagus; spermatheca with a simple bulb with a long slender duct (New Zealand) .. .. **Margareta**
One or no fore femoral spines present; suture between sterna 4 and 5 curving only slightly cephalad and attaining connexival margin (figs. 35–39); head and pronotum sparsely pilose with short hairs; holding sclerites present in phallus (hs, figs. 10–20); spermatheca with bulb or duct modified (figs. 40–45) 9

9. Lateral margins of pronotum vertically rounded; head with irridescent pruinosity; metathoracic tibiae and femora bearing rows of strong moveable spines; 2nd antennal segment longer than pronotum; spermatheca with long narrow duct (fig. 45); phallus with broad helicoid process present (fig. 20) (S. Africa) .. .. **Paracnemodus**
Lateral margins of pronotum carinate (sometimes bluntly so); head shiny; metathoracic tibiae with at most two short rows of weak spines present; 2nd antennal segment shorter than or subequal to length of pronotum; spermathecal duct short and expanded (figs. 40–44); phallus with helicoid process narrow or reduced (figs. 10–19) .. 10

10. Lateral margins of pronotum sharply and acutely carinate; pronotum distinctly bicoloured with pale posterior lobe; phallus with gonoporal process extremely elongate and unsclerotized (fig. 19) (Tasmania).. .. .. .. **Tasmanicola** n. g.
Lateral margins of pronotum bluntly carinate; pronotum unicolorous; phallus with short heavily sclerotized gonoporal process (figs. 10–17, 22) (S. Africa; Madagascar) 11

11. Head rugulose, lacking head grooves; pronotum and corium shining (like head); only soft setae present on hind tibiae; no pseudosutures (fig. 35) on sterna 3 and 4 in adults; spiracle 5 directly above posterior pair of trichobothria (fig. 35) (S. Africa) **Capenicola** n. g.
Head punctate with head grooves present; pronotum and corium distinctly pruinose, contrasting with shining head; outer surface of hind tibiae with two rows of short spines and soft setae present; pseudosutures present on sterna 3 and 4 in adults (ps, figs. 36–39); spiracle 5 distinctly anterior to posterior pair of trichobothria **Notiocola** n. g.

Notiocola new genus

Head porrect, strongly shining, contrasting strikingly with dull subpruinose and iridescent texture of corium and hemelytra; pronotum with anterior calli contiguous, smooth, convex and usually impunctate, posterior pronotal lobe irregularly punctate, transverse

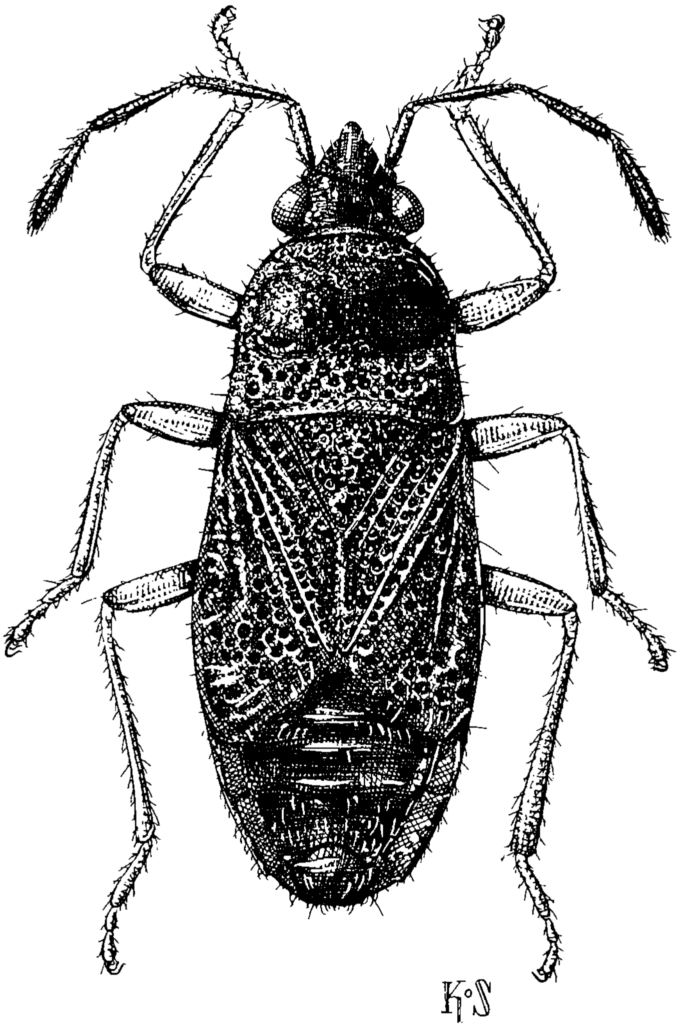


Fig. 5. Dorsal view of *Capenicola tafelbergiensis* n. sp.

impression obsolete, lateral pronotal margins bluntly carinate or slightly explanate, never acutely carinate, posterior pronotal margin straight or very shallowly concave; scutellum with a shallow, broad median impression, lacking a median carina; clavus with three distinct rows of punctures, an irregular field of punctures present between inner and median rows; post cubitus elevated and calloused; corium with a calloused stripe (Cu) adjacent to claval suture and bounded on either side by a row of punctures which become obsolete posteriorly, lateral corial margins strongly explanate and evenly sinuate; membrane of forewing smoky gray with contrasting pale veins; fore femora slender, little incrassate, armed below on distal third with a single short spine, hind tibiae bearing both fine hairs and (on outer surface) two rows of movable spines; metathoracic scent gland orifice small, acuminate, curved caudo-dorsad; labium reaching metacoxae; antennal segments 2 and 3 slender, terete, segment 4 narrowly fusiform, segment 1 exceeding apex of tylus by approximately ½ its length; inner laterotergites present on segments 3 or 4 to 6, intersegmental suture between sterna 4 and 5 curving slightly cephalad and attaining connexival margin, trichobothria on segment 5 with one anterior, posterior pair with one above the other located posterior to spiracle of segment 5, but closer to spiracle than to posterior margin of segment, vertical pseudosutures present (ps) on sterna 3 and 4, abdominal suture between segments 3 and 4 finely crenulate; female genitalia: ovipositor only dividing sternum 7, apices of gonopophyses blunt; spermatheca (figs. 40–44) with short expanded duct, distal portion very lightly sclerotized, basal portion membranous, bulb spherical, sometimes with basal rim or neck; male genital capsule (figs. 29–30) sub-spherical with an apical indentation, dorsal opening subcircular; parameres (figs. 23–26) relatively short with pilose median and lateral lobes, apical hook short, lightly curved; phallus (figs. 10–17) with short cylindrical phallobase and desclerotized dorsal surface; conjunctiva short, membranous without lobes; vesica with large seminal chamber, wings apically bent down, one pair of holding sclerites present, these sometimes reduced, helicoid process present, usually reduced to a flap; gonoporal process thickened and heavily sclerotized into an inflexible loose coil; nymphs (fig. 50) with Y-suture present on abdomen, abdomen red pigmented with lateral white mottling, moderate-sized evaporative plates present around scent gland openings between terga 3–4, 4–5 and 5–6; thoracic sclerites fuscous; head yellowish, a short epicranial stem present; eggs (figs. 48–49) relatively short, cucumber-shaped, smooth, with 5–6 short chorionic processes.

Type Species: *Notiocola emlembei*, new species

General biology: The known species are seed feeders and frequently, but not exclusively, have been taken feeding on *Erica* seeds. The species were found associated with Cape floral vegetation of either herb or shrub formation type and appear to be restricted to relatively cool moist habitats in thick shaded leaf litter on rich humus-laden porous soil. The limited occurrence of cool moist biotopes in the relatively dry Cape region helps explain both the scarcity of the species and the high speciation pattern of the genus. If the Madagascaran species is similarly cool-adapted and specialized in its habitat as the high altitude collection at nearly 6,500 feet suggests, its occurrence in Madagascar has still more zoogeographical significance.

This genus has considerable superficial resemblance to the New World genus *Ozophora* (Ozophorini) in its somewhat flattened hemelytra, long body, long slender legs and antennae, porrect head, and mottled ferruginous coloration as mentioned above. It differs from most other genera of Stygnocorini in the sharp contrast between the strongly shining head and the dull somewhat iridescent pronotum and hemelytra. In *Paracnemodus* both the head *and* pronotum are dull pruinose and the pronotum curves smoothly along the lateral margin, with only a slight callus indicating the transition. In *Tasmanicola* the head and pronotum also differ in texture, but not so strikingly, and the pronotum is acutely carinate not bluntly carinate as in *Notiocola*. *Notiocola* may also be separated from *Margareta* by its complete sternal suture between abdominal segments 4 and 5, by the presence of one rather than three fore femoral spines, three rather than four complete rows of claval punctures, and its much less hirsute dorsum. The phallus of *Notiocola* differs from that of

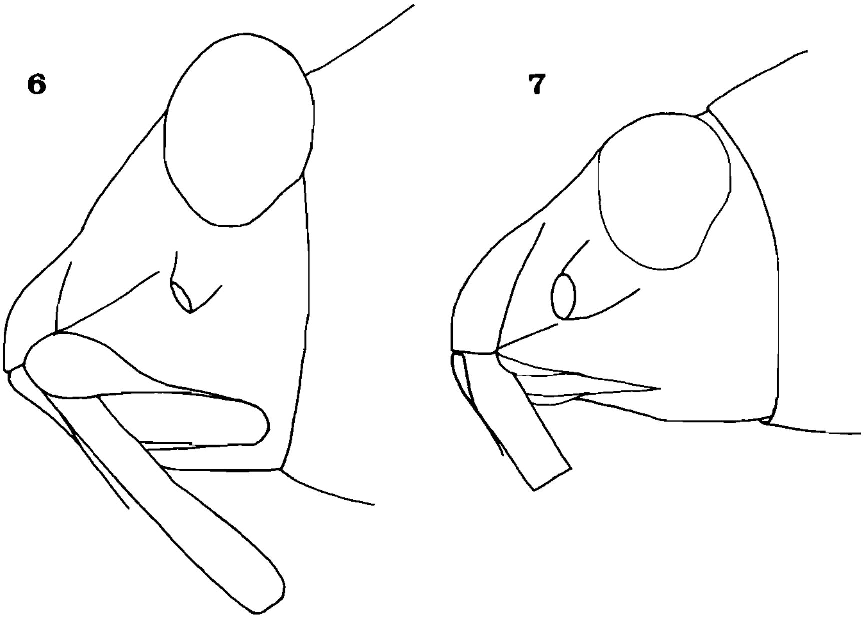
Margareta in its possession of a helicoid process and holding sclerites and, together with *Capenicola*, differs from all other genera in its thickened and heavily sclerotized gonoporal process. Similarly *Notiocola* resembles *Capenicola* and *Bathydema* (fig. 46) in its unusual spermathecal structure in which the duct is very short and expanded distally. In *Capenicola* the head is rugulose rather than punctate, and the pronotum is not pruinose. *Notiocola* has two rows of short movable spines on the outer surface of the hind tibiae; the other genera mentioned above have mutic tibiae or, in *Paracnemodus*, four rows of long stiff spines.

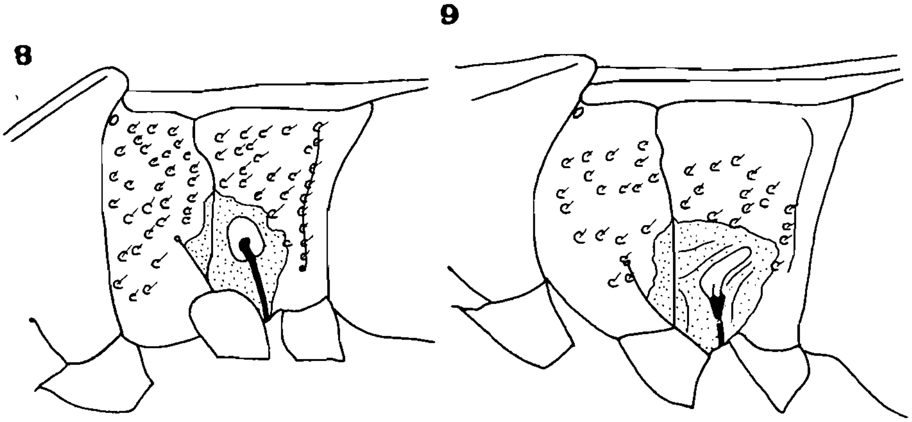
Key to species of *Notiocola*

1. Distal ½ of antennal segments 3 and 4 black, conspicuously contrasting with pale colouration of remainder of segments .. .. .. **madagascariensis** n. sp.
   Antennal segments 3 and 4 uniformly pale testaceous, similar in colouration to other preceding antennal segments 2
2. Pronotum and hemelytra appearing glabrous, with only extremely short inconspicuous scattered hairs present on dorsal surface 3
   Pronotum and hemelytra clothed with conspicuous semi-erect hairs 4
3. Antennal segments 2 and 3 with relatively short hairs that are shorter or at most only slightly longer than width of antennal segment; length of antennal segment 2 less than 1¾ times times interocular width; general colouration light ferruginous; only 4–5 claval punctures present between inner and median rows of punctures; phallus (fig. 10) with coiled helicoid sclerite and bowl-shaped apex of gonoporal process; spermathecal duct with a broad distal rim (fig. 41).. .. .. **riebeecki** n. sp.
   Hairs on antennal segments 2 and 3 elongate and upstanding, considerably longer than width of antennal segment; length of 2nd antennal segment usually about two times interocular width; clavus and corium mottled testaceous, dull brown and black; a field of 20 or more claval sutures present between inner and median rows of punctures; phallus (fig. 16) with flap-like helicoid process, apex of gonoporal process scoop-shaped; spermathecal duct (fig. 43) with narrow distal sclerotized rim **emlembei** n. sp.
4. Eyes very large, ratio of width of head across eyes to interocular space 1·75; spermatheca (fig. 42) with sclerotized rim on distal margin of spermathecal duct, no neck present; phallus (fig. 15) with apex of gonoporal process scoop-shaped; holding sclerites (hs) reduced and pointed; vesica with irregular lightly sclerotized external ring (macropters only known) .. .. **hutchinsoni** n. sp.
   Eyes relatively small, ratio of head width to interocular space 2·97; spermathecal bulb with a basal sclerotized neck, distal portion of spermathecal duct membranous (fig. 44); phallus (fig. 12) with apex of gonoporal process narrow and pointed, holding sclerites large and apically truncate; vesica externally unsclerotized with 2 finger-like lobes (brachypters only known) .. .. **quathlamba** n. sp.

Notiocola riebeecki new species (fig. 2)

General colouration rich ferruginous brown over entire body surface, becoming somewhat testaceous along postcubitus which has a dark dash on distal ⅓, base of corium, proximal $\frac{2}{3}$ of radial vein, and at extreme posterior end of claval commissure. Corium marked with black as follows: a suffused bar on distal $\frac{1}{4}$ lying just within lateral margin and broadly reaching apex, an irregular ovoid blotch at posterior end of raised area of radial vein at level of end of claval commissure, inner half of apical corial margin and along cubital vein midway to base; membrane black to dark smoky gray-brown, veins lighter but much more heavily infuscated than in other species; below nearly uniformly ferruginous; legs uniformly sordid yellowish brown; antennae with 1st segment ferruginous





Figs. 6–7. Heads, lateroventral view, showing union of bucculae. 6. *Stygnocoris sabulosus* Schilling. 7. *Capenicola tafelbergiensis*.

Figs. 8–9. Meso- and metapleura, lateral view, showing scent gland orifice structure. 8. *Stygnocoris sabulosus*. 9. *Capenicola tafelbergiensis*.

to brown, nearly unicolorous with legs, segments 2, 3 and 4 much darker; vestiture consisting of very short inconspicuous hairs, those on pronotum, scutellum, clavus and corium usually shorter than distance between punctures, becoming slightly longer laterally along pronotal margins, but overall sparse and inconspicuous, giving a glabrous appearance; antennal hairs relatively short, of nearly uniform length, semi-decumbent, on 2nd and 3rd segments not or at most very little longer than width of segment; pronotal punctures present anterior to calli and over posterior half of pronotum, punctures on scutellum shallow, widely separated, and having an obsolete appearance, claval punctures in three distinct rows, but area between inner and median puncture rows bearing only three to four punctures, fewer than in other members of the genus.

Head with eyes relatively widely separated, ocelli large, tylus reaching nearly midway to distal end of 1st antennal segment, length head ·62, width head ·80, interocular space ·50; pronotum with area of calli represented by a broad smooth impunctate, evenly convex area extending to lateral margins of pronotum, posterior margin evenly and very shallowly concave, transverse impression obsolete, at most weakly represented by an impressed area laterally, lateral margins sinuate, narrowing from humeri but becoming slightly swollen and convex adjacent to calli, surface lacking impressed areas midway between meson and margin at posterior area of calli, length pronotum ·86, width pronotum 1·32; scutellum obsoletely punctured with rugose transverse ridges but these relatively weak, length scutellum ·68, width scutellum ·62; hemelytra with lateral corial margins evenly convex, radial vein strongly raised and ridged on proximal $\frac{3}{4}$, corial margins conspicuously explanate, membrane somewhat reduced, extending onto basal $\frac{1}{3}$ or $\frac{1}{4}$ of 7th abdominal tergum, leaving lateral areas of tergum 6 exposed, length claval commissure ·52, distance apex clavus—apex corium ·76, distance apex corium—apex abdomen ·84; abdomen (fig. 36) with spiracles 2 and 4 hidden under epipleura, suture between sterna 4 and 5 curving slightly anteriorly, not joining trichobothrial furrow, attaining epipleural impression, suture between sterna 3 and 4 and 4 and 5 finely crenulate; length labial segments I ·78, II ·64, III ·48, IV ·32; antennae relatively short and stout for genus, segment 1 somewhat clavate, 2 terete, 3 very narrowly fusiform, 4 somewhat more robustly fusiform, length antennal segments I ·52, II ·80, III ·62, IV ·64; total length 4·16; phallus (figs. 10, 11) with gonoporal process thick, heavily sclerotized, of 4 turns with bowl-shaped apex, helicoid process of 1 turn, narrow, holding sclerites triangular in lateral view, attached by narrow basal process to seminal chamber, no sclerotizations on surface conjunctiva or vesica, dorsum of phallotheca desclerotized; genital capsule (fig. 29) subspherical, apically indented, its dorsal opening with two lateroanterior notches, parandria pointed, relatively narrow; parameres as in fig. 23, hook only slightly curved; spermatheca (fig. 41) with broad rim below bulb, duct broad, less than twice length of bulb; each gonapophysis bearing two long hairs.

Holotype: ♂ SOUTH AFRICA: *Cape Province*, Table Mt. (West Table), elev. 3,500 ft, 7 December 1967 (M. H. Sweet). In National Collection of Insects, Pretoria.

Paratypes: 5 ♂, 5 ♀, same data as holotype. In J. A. Slater and M. H. Sweet collections.

This new species, together with *N. quathlamba*, represent the two members of the genus which are presently known in the brachypterous conditions. As with many other Rhyparochrominae this brachyptery involves only the membrane in that the clavus and corium are not shortened, reduced or fused.

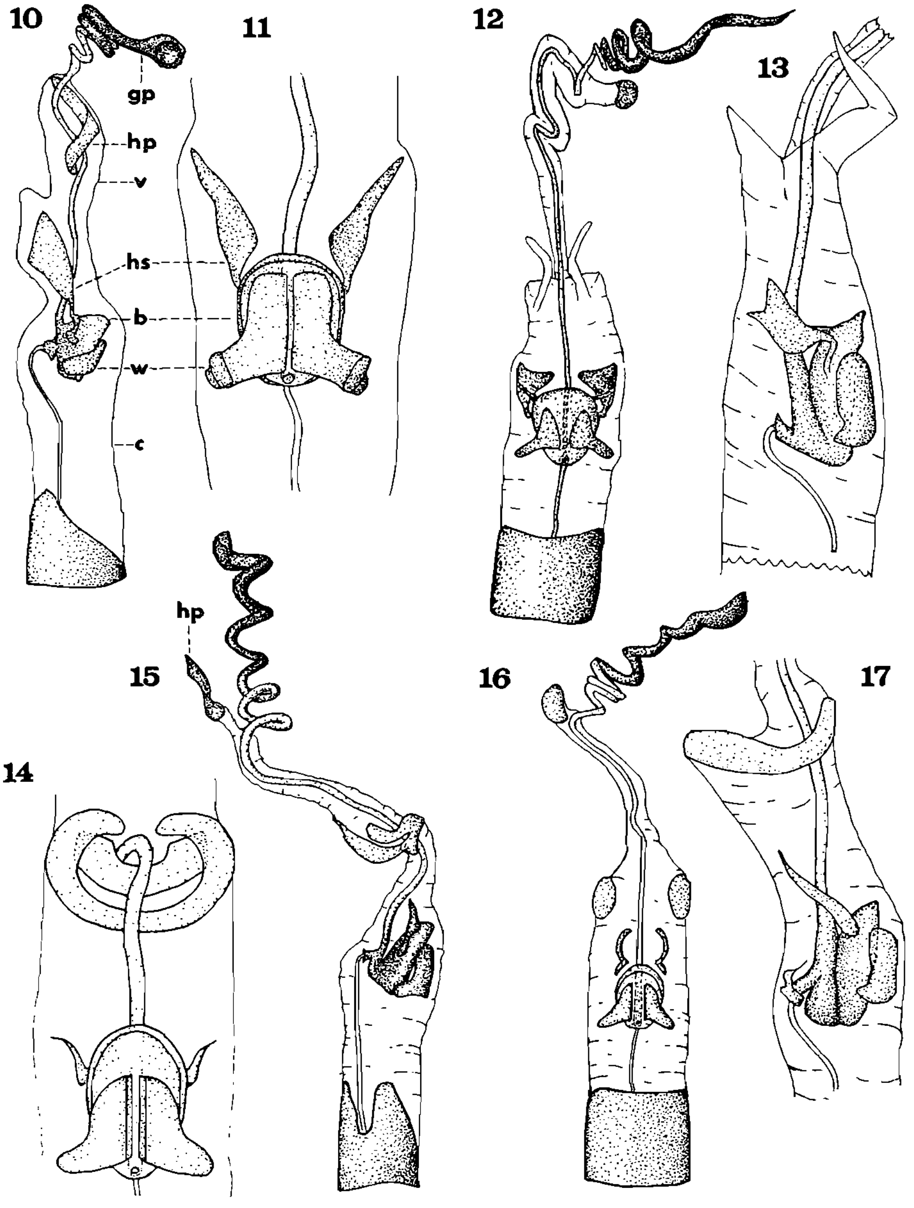
N. riebeecki is easily separable from the other species by its bright reddish brown ferruginous colour and by its distinct genitalia (figs. 10, 11, 41). The punctures on the pronotum are somewhat obsolete, giving this species a smooth appearance quite distinctive for the genus. These, of course, are comparative features. The species can be separated from *N. quathlamba*, its closest relative, by the fact that the 2nd antennal segment in *quathlamba* has very long upstanding hairs which are longer than the width of the segment. Also *riebeecki* has much smaller more widely separated eyes, which can best be expressed by the eye width relative to the interocular space being ·30 in *riebeecki*, and ·22 in *quathlamba*. The clavus of *quathlamba* is dark chocolate brown with the postcubitus a strongly contrasting pale yellow. In *riebeecki* the postcubitus is nearly uniformly red-brown, only very slightly paler and definitely not a contrasting chocolate brown. *Quathlamba* has the pronotum, particularly the calli, blackish as is the basal area of the scutellum, and the clavus and corium are pale testaceous. In *riebeecki*, as noted above, the pronotum and hemelytra are nearly uniformly reddish ferruginous.

Despite the difficulty of comparing this species with completely macropterous individuals *N. riebeecki* can readily be distinguished from *hutchinsoni* by a number of characters. *Hutchinsoni* has elongate hairs on the pronotum and corium that are lacking in *riebeecki*. *Riebeecki* can also be separated by the lack of impressed areas on the posterior margin of the calli and mesally on the posterior lobe, by its much shorter thicker antennae, lacking hairs that are longer than the width of the 2nd antennal segment, the lack of dark chocolate brown areas on the clavus, and the lack of darkened areas on the distal half of the femora. Also in *riebeecki* the eyes are much smaller and set further apart than in *hutchinsoni*, and the grooves between the ocelli are obsolete, whereas they are strongly developed in *hutchinsoni*. The glabrous appearance of *riebeecki* is rather similar to that found in *emlembei*, but it can readily be differentiated by the shorter antennal hairs, the much thicker and relatively shorter antennae, more widely spaced eyes, lack of depressed areas mesally on the pronotum and at the posterior margin of the callosities, and particularly by the very different coloration which is of course ferruginous in the present species, and while reddish brown on the pronotum of *emlembei*, the latter has a mottled black testaceous and dull brown clavus and corium, quite in contrast with *riebeecki*. In this species there are many fewer punctures on the clavus between the inner and median puncture rows than there are in *emlembei*. Whether this is attributable to brachyptery or not is difficult to ascertain until macropters and brachypters of both species can be compared, but it is very striking that only four or five punctures are present in this area in *riebeecki*, and as many as twenty to thirty in *emlembei*.

This species is named in honour of Jan van Riebeeck, founder of the first European colony in the Cape.

Biology

During our South African collecting *Notiocola riebeecki* was found in only one small location on the south facing slope of Table Mountain, despite sampling over a large portion of the western table. This microhabitat was quite unusual in being a deep cave-like crevice about 10 feet deep which enclosed an area of only a few square metres. The bottom of the crevice was covered with a thin restionaceous plant and a straggling growth of the com-



Figs. 10–17. Phalli of species of *Notiocola*. 10. lateral view, *riebeecki*. 11. dorsal view, seminal chamber, *riebeecki*. 12. dorsal view, *quathlamba*. 13. lateral view, seminal chamber, *quathlamba*. 14. dorsal view, seminal chamber, *hutchinsoni*. 15. lateral view, *hutchinsoni*. 16. dorsal view, *emlembei*. 17. lateral view, seminal chamber, *emlembei*: b, body; c, conjunctiva; gp, gonoporal process; hp, helicoid process; hs, holding sclerites; v, vesica; w, wings.

posite, *Helichrysum cymosum* (L.) Less., which was in flower and seed. *Erica* spp. overhung the crevice. The substrate was a moist 4–5 inch layer of leaf litter and humus on a weak base. The light intensity was very low, at 1.30 p.m. on 7 December 1967 (a sunny day), reading only 34–80 f.c. The ground temperature was 58° while the air temperature was 81°F. The ground was kept moist by constant seepage. The insects were present on 7 December only as adults in a low abundance of 4–5 per square metre, concealed under 1–3 inches of litter. Several pairs were copulating. This species was so intolerant of heat that despite no direct exposure to sunlight or excessive temperatures, the insects died or were heat-shocked beyond recovery *en route* to the laboratory. The heat shock response involves leg paralysis similar to that seen in the similarly cool-adapted North American species *Drymus unus* V.D. and *D. crassus* Barber (Sweet, 1964). On a return trip on 24 January 1968 no adults could be found but several first, second and third instar nymphs were collected and subsequently reared out to *riebeecki*. The nymphs fed on *Helichrysum*, *Erica* and sunflower seeds in the laboratory.

In association with *Notiocola* were three species of *Lasiosomus*, two of *Cligenes*, one of *Eremocoris* and, attesting to the wet conditions, a species of Mesoveliidae (*Paraphrynovelia brincki* Poisson).

Descriptions of Nymphs

Fifth Instar (alcohol) (fig. 50)

Head, thoracic sclerites and appendages subshining yellow-brown, slightly darker on pronotal calli and centre of wing pads, becoming yellow on vertex of head, anterior and lateral margins of pronotum and of wing pads; abdomen red with lateral pale areas dorsally and ventrally, abdominal sclerotized patches brown; clothed with very short semi-erect pale hairs sparsely and irregularly distributed over entire surface; two rows of 6–7 tiny-movable spines (shorter than hairs) present on outside (anterior) surface of hind tibiae; one pair of head trichobothria present, two short eye-setae present on posterior part of eye; head subtriangular from above, moderately porrect, vertex slightly convex; eye not in contact with anterior margin of pronotum (postocular distance 0·08), epicranial stem short (0·08), at rest hidden under anterior margin of pronotum, length head 0·68, width across eyes 0·83, interocular distance 0·50, preocular distance 0·50, length antenniferous tubercles 0·13; antennae with segments 1, 2, and 3 slightly terete, 4 fusiform, length antennal segments I 0·43, II 0·58, III 0·47, IV 0·50; labium attaining metasternum, length labial segments I 0·53, II 0·50, III 0·50, IV 0·35; pronotum and wing pads with lateral margins translucently lamellate, pronotum quadrate, slightly convex, narrowing markedly from humeri to anterior margin, lateral margins slightly convex, anterior margin slightly convex, posterior margin nearly straight, narrow posterior lobe set off by an indistinct transverse line and lateral indentations inside of lamellae, width of pronotum across humeri 1·20, length 0·70, length posterior lobe 0·15; lateral margins of wing pads slightly convex, wing pad length 1·13, attaining abdominal tergum 3, maximum width 1·55; pleura quadrate, pro- and mesopleura with rounded dorso-posterior corner, narrow portion of flange present on metapleuron; fore femora incrassate, armed with one ventral movable short spine mounted on a short spur, 0·25 from distal end of femur, femoral width 0·30, length 0·25, legs moderately long, hind tibiae strongly curved, length 1·27, hind tarsal segment lengths, I 0·40, II 0·30; abdomen oval with Y-suture present; moderately large 'evaporative' sclerites surrounding dorsal scent orifices, distances between orifices 3–4 0·40, 4–5 0·33, 5–6 0·30, dorsum of abdominal segment 9 sclerotized, ventral sclerites present on segments 7, 8, and 9, 10 a ring sclerite; trichobothrial spots form conspicuous small sclerites, on segment 5 the posterior pair of trichobothria is closer to the spiracle (0·50) than to posterior margin of segment (0·11); vertical pseudosutures present on lateral portions of segments 3 and 4, length abdomen 1·70; total length 4·25.

Fourth Instar (exuvium only)

Coloration of integument as in instar 5 with vertex of head distinctly yellow; width head 0·75, interocular width 0·50; length antennal segments I 0·30, II 0·43, III 0·35, IV —; length labial segments I 0·38, II 0·33, III 0·28, IV 0·28; length pronotum 0·58, width 1·15; fore femora with ventral spine distinct, length fore femur 0·78, width 0·28; length hind tibia 1·00, length hind tarsal segments I 0·31, II 0·23.

Third Instar (alcohol)

Coloration much as in instar 2 and 5 except that entire head is distinctly light yellow, contrasting with brown notal sclerites; abdomen with mesal $\frac{2}{3}$ faded red with yellow suffused along intersegmental sutures, margin patches of red distinct on each segment, abdominal segment 1 white; investiture as in instar 5; form relatively narrower than 5, head length 0·33, width 0·55, interocular distance 0·38; length antennal segments I 0·22, II 0·33, III 0·26, IV 0·43; length labial segments I 0·35, II 0·31, III 0·27, IV 0·27, attaining 3rd abdominal sternum; pronotum with narrow translucent explanate lateral margins, length 0·38, width 0·77; mesonotum with small wing pads present, length 0·22, width 0·88, pleura with quadrate dorsal margins, a diagonal suture present on metapleuron as in instar 5, no flange present on posterior margin of metapleuron; length fore femur 0·53, width 0·20, very small movable ventral spine present, length hind tibia 0·68, lengths hind tarsal segments I 0·20, II 0·19; abdominal scent gland sclerites large, distances between scent gland orifices 3–4 0·27, 4–5 0·22, 5–6 0·20; terminal sclerites as in instar 5, but relatively smaller; width abdomen 1·13, length 1·08, total length 1·45.

Second Instar (alcohol)

Coloration much as instar 5 except thoracic sclerites and appendages brown rather than yellow brown; ventral abdominal sclerites on segments 7, 8, and 9 relatively smaller, lateral abdominal margins distinctly white; fore femoral spine represented by a tiny seta; form narrower, with wing pads barely present; length head 0·32, width head across eyes 0·48, interocular width 0·35; length antennal segments I 0·20, II 0·22, III 0·16, IV 0·35; labium attaining abdominal segment 3, length labial segments I 0·22, II 0·25, III 0·22, IV 0·22; length pronotum 0·25, width across humeri 0·55, length mesonotum 0·10, width 0·72; distance between scent gland orifices: 3–4 0·22, 4–5 0·18, 5–6 0·16; length of abdomen 0·75; total length 1·50.

First Instar (alcohol)

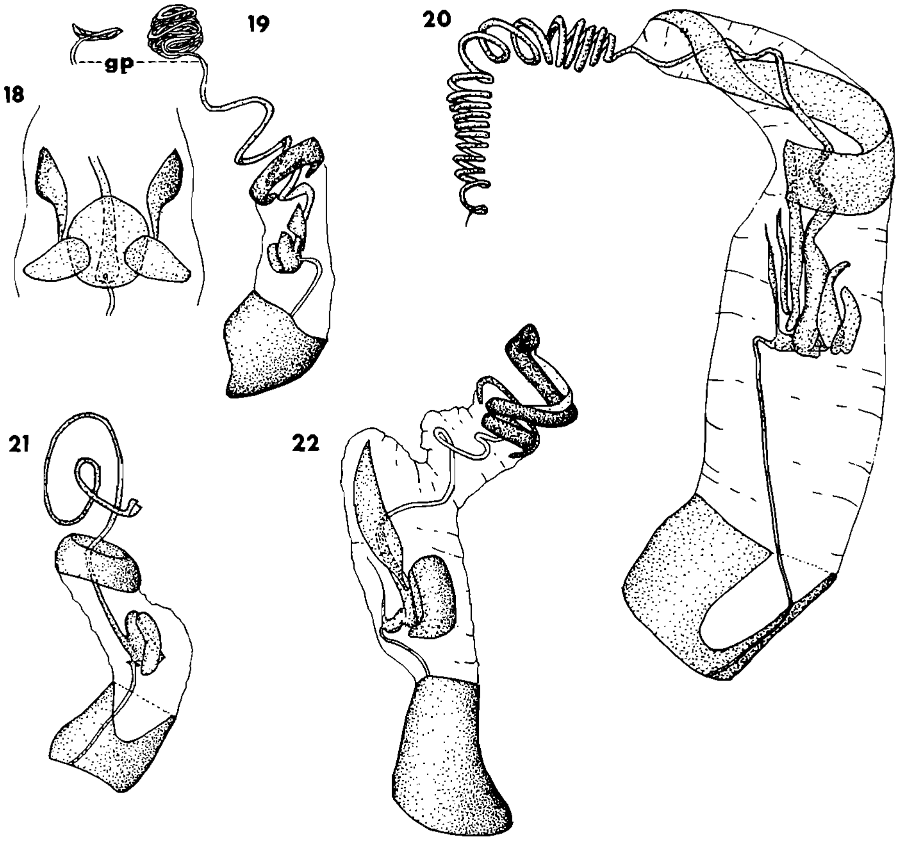
Head, thoracic notal and pleural sclerites and abdominal sclerites shining brown, appendages pale brown, especially antennal segment 4; abdomen light orange, slightly paler along abdominal sutures; relatively long erect hairs present on head and pronotum, elsewhere setae shorter and scattered, no movable spines on hind tibiae; head relatively declivent, cylindrical in shape to antenniferous tubercles, then tapering abruptly to tylus, eye with 22 facets and two eye setae present, eyes barely protruding laterad, epicranial arms straight, extending to eyes, epicranial stem relatively long (·08), not completely covered by anterior margin of head, length head 0·18, width head 0·38, interocular width 0·27; antennae relatively stout with segment 1 terete, 2 and 3 cylindrical, 4 very long and narrowly fusiform, length antennal segments I 0·13, II 0·15, III 0·13, IV 0·33; labium extending to abdominal segment 4, length labial segments I 0·22, II 0·25, III 0·15, IV 0·20; pronotum transversely convex above (especially along anterior margin), lateral margins ecarinate, length pronotum 0·20, width pronotum 0·45; mesonotum straplike with lateral margins enlarged, length 0·08, width 0·42, metanotum of two quadrate sclerites widely separated, much smaller than mesonotum; all pleura with dorsal margins rounded; legs relatively short, fore femora mutic, very slightly more incrassate than posterior femora, length 0·28, width 0·10, hind tibiae straight, length 0·38, length hind tarsal segments I 0·15, II 0·13; abdomen with no Y-suture configuration visible, segments 1–3 relatively long, distance from segment 1 to 1st scent gland equal to distance from scent gland to apex of abdomen (0·36); scent gland orifices surrounded by conspicuous sclerites, distances between orifices 3–4 0·13, 4–5 0·13, 5–6 0·10; oval mesal sclerite present on tergum 9, small mesal sclerites present on sterna 8 and 9; trichobothria not surrounded by conspicuous sclerites as in later instars; width of abdomen 0·58, length 0·70; total length 1·29.

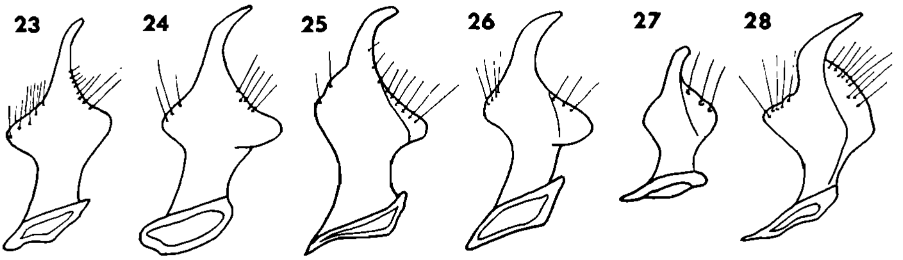
Egg (ovarian) (fig. 48)

Relatively short, 'cucumber' shaped, with dorsal side convex, ventral slightly concave, apical and posterior ends rounded, chorion transparent, faintly yellow, with six short micropylar processes present in hexagonal arrangement at anterior end of egg; maximum width 0·27, length 0·50.

Notiocola quathlamba, new species (fig. 3)

General coloration dark for genus, a variegated black, sordid brown, testaceous and fuscous; head shining, reddish brown; pronotum very dark fuscous across calli, but pale reddish brown nearly testaceous anterior to calli and completely over posterior lobe, becoming slightly infuscated in area of humeri; scutellum with basal half dark chocolate brown with exception of extreme lateral margin, distal half pale reddish brown; clavus nearly completely chocolate with exception of raised postcubitus which is testaceous, also pale testaceous at extreme apex and narrowly along claval commissure; corium marked as follows: testaceous coloration along lateral margin, broadened basally and along area of radial and cubital veins, former interrupted with a chocolate dash about at level of apex of claval commissure, also with a large ovoid testaceous spot adjacent to inner angle of apical corial margin, but not reaching claval commissure, remainder of distal ½ of corium dark chocolate brown, basal ⅔ of corium laterad of radial vein dull brown, membrane dark smoky grey-brown with veins pale testaceous; antennae with segments 1 and 2 reddish brown, segments 3 and 4 fuscous to nearly piceous; below with meso- and metapleuron chocolate brown, remainder of ventral surface bright red-brown; legs bright yellowish testaceous, becoming infuscated with red-brown on distal ¼ of femora; vestiture relatively conspicuous with scattered semi-decumbent hairs on pronotum, scutellum and hemelytra, these hairs often semi-erect, conspicuous, and as long as distance between punctures, particularly on clavus and laterally on pronotum; hairs on antennae extremely elongate, much longer than width of either antennal segments 2 or 3, interspersed with shorter decumbent hairs; pronotum coarsely punctate before calli and over entire posterior lobe, scutellar punctures obsolete except on distal $\frac{1}{4}$, clavus with about a dozen irregularly placed punctures between inner and median puncture rows.





Figs. 18–22. Phalli of Stygnocorini genera. 18. dorsal view, seminal chamber, *Tasmanicola truganinae* n. sp. 19. lateral view, *Tasmanicola*. 20. lateral view, *Paracnemodus*. 21. lateral view, *Bathydema socia* (Uhler). 22. lateral view, *Capenicola tafelbergiensis*.

Figs. 23–28. Right parameres, ventral view. 23. *Notiocola riebeecki*. 24. *N. quathlamba*. 25. *N. hutchinsoni*. 26. *N. emlembei*. 27. *Capenicola tafelbergiensis*. 28. *Tasmanicola truganinae* gp, gonoporal process.

Head with tylus extending anteriorly at least to middle of 1st antennal segment, eyes rather prominent, large, grooves between ocelli obsolete, length head ·80, width head ·86, interocular space ·48; pronotum with calli smooth, lacking punctures along midline between calli, the latter with a slightly impressed area posteriorly on either side midway between meson and margin, a slight depression mesally on posterior pronotal lobe and a prominent depression adjacent to lateral margin behind calli on either side, posterior margin very slightly concave, nearly straight, lateral margins sinuate, strongly produced across humeri, then curving concavely and convexly enlarged again adjacent to calli, length pronotum ·84, width pronotum 1·38; scutellum with transverse rugosities weak and rather obsolete, length scutellum ·70, width scutellum ·74; hemelytra with lateral corial margins convex, explanate, slightly upturned, radial vein appearing raised almost to apical corial margin, membrane slightly reduced, but reaching at least midway over 7th abdominal tergum, distance apex clavus—apex corium 1·06, distance apex corium—apex membrane ·70, distance apex corium—apex abdomen ·80; abdomen (fig. 37) with spiracles 2 and 4 hidden under epipleura, suture between sterna 4 and 5 curving slightly anteriorly, touching trichobothrial furrow, and continuing to connexival margin, intersegmental suture between sterna 3 and 4 finely crenulate; length labial segments I ·58, II ·62 (from paratype—III ·50, IV ·40); antennae rather elongate, slender, length antennal segments I ·56, II ·86, III ·60, IV ·76; total length 4·48; phallus (figs. 12, 13) with thickened sclerotized gonoporal process of 5 turns with apical end extended and pointed, helicoid process modified into small oval flap on apical end of membranous vesica, apex of conjunctiva with two dorsal finger-like lobes which bend down, holding sclerites short, triangular and attached by *two* struts to body of seminal chamber, wings basally broad, apically narrow, phallotheca with only dorsum desclerotized; parameres as in fig. 24; genital capsule (fig. 30) opening with no anterior notches, parandria broad, caudal apex pointed; spermatheca (fig. 44) with distal spherical sclerotized bulb and narrow neck, duct short, less than twice length of bulb, distally expanded but with no sclerotized apical rim present.

Holotype: ♂ LESOTHO: Sani Pass, 8,000 ft, 10 March 1968 (J. Munting, S. Slater, T. Schuh, M. Sweet # 217). In National Collection of Insects, Pretoria.

Paratypes: 9 ♂, 10 ♀, same data as holotype. In J. A. Slater and M. H. Sweet collections.

N. quathlamba is most closely related to *hutchinsoni.* The relationships of this species to the other three known South African species are discussed under the respective species.

The name of this species is the original African name for the east face of the Drakensberg escarpment.

Biology

N. quathlamba was collected near the Sani Pass Road, on the Lesotho border on the eastern face of the Drakensberg escarpment. The collecting site was a steep slope below the road cut and next to a small stream which the road fords. The location at that time was very wet from condensation from the cloud layer meeting the mountain at this level. (The driver for our party indicated that this was frequently the case at this altitude.) While the general area had a shrubby, in large part proteaceous, Cape-type vegetation on a thin stony soil, the collecting site itself supported a dense, rank association of medium to tall forbs (*Helichrysum*, *Geranium* sp., *Papaver* sp. and others) growing on a thick layer of porous black topsoil. This peculiar edaphic situation evidently resulted from erosion products of the road cut and the stream above, which probably acts to maintain this evidently subclimax vegetation.

This habitat supported a ground lygaeid association of eight species of which *Notiocola quathlamba* was the least abundant, numbering about 5–6 per square metre and was restricted to moist shaded litter or to the basal rosettes of *Helichrysum*. A few second and third instar nymphs were collected and several pairs were found *in copulo*. Unlike the other rhyparochromines, the majority of the specimens of *Notiocola* died *en route* to the laboratory. In the laboratory the few surviving adults oviposited, laying eggs both loose and into wet cotton swabs. The adults fed on *Helichrysum*, *Papaver*, *Erica* and sunflower seeds but became paralytic in a few weeks and died. The eggs developed to late eye spot stage (katatrepsis) but did not hatch.

Descriptions of Nymphs

Third Instar (alcohol)

Thoracic and abdominal sclerites shining brown, becoming yellowish on dorsal $\frac{1}{3}$ of pleura and pronotal calli, head yellow with mesal brown band extending from posterior margin to tylus, small brown spot on antenniferous tubercle; legs and labium pale brown; antennae with segments 1 and 2 yellow-brown, 3 and 4 brown; abdomen largely pale yellow, mesal $\frac{1}{3}$ bright red between scent gland sclerites, lateral portions of abdominal terga suffused with red; head, antennae, notal sclerites bearing numerous erect pale hairs longer than width of antennal segments, shorter hairs elsewhere; head relatively declivent, antenniferous tubercles barely visible from above, eyes moderately prominent, 27 facets present, one long, one short eye setae present, length of head 0·40, width across eyes 0·58, interocular distance 0·40; antennal segment 1 terete, exceeding tylus by $\frac{1}{3}$ its length, segments 2 and 3 cylindrical, 4 narrowly fusiform, length antennal segments I 0·26, II 0·40, III 0·30, IV 0·43; labium attaining abdominal segment 4, length labial segments I 0·38, II 0·40, III 0·30, IV 0·26; pronotum and wing pads with lateral margins narrowly convex, explanate, lamellae translucent, pronotum slightly convex, anterior and posterior margins nearly straight, pronotum broadest just anterior to humeri, length pronotum 0·35; width pronotum 0·83; mesonotum with wing pads barely evident, length 0·22, width 0·97, metanotum with two triangular plates that narrow toward ecdysial line; pleura quadrate with dorso-posterior corners rounded; legs moderately long, fore femora somewhat incrassate, with small movable spine, 0·18 from apex, length of fore femora 0·63, width 0·22; abdomen with Y-suture and conspicuous scent gland sclerites, width between scent gland orifices 3–4 0·25, 4–5 0·18, 5–6 0·18, length scent gland sclerites 3–4 0·08, 4–5 0·05, 5–6 0·05; small terminal mesal sclerites present on tergum 9 and sterna 6, 7, 8, and 9; trichobothria not on conspicuous sclerotized spots, posterior pair on segment 5 directly beneath spiracle; width of abdomen 1·13, length 1·15, total length 2·10.

Second Instar (alcohol)

Similar to instar 3, head and antennal segments 1 and 2 clear yellow, pronotal calli yellowish, abdomen paler yellow with red areas reduced; investiture and shape similar to instar 3, pronotum and mesonotum with lateral margins opaquely explanate and more

convex, length head 0·35, width across eyes 0·51, interocular distance 0·38; length antennal segments I 0·25, II 0·33, III 0·22, IV 0·38; length labial segments I 0·30, II 0·25, III 0·25, IV 0·26; length pronotum 0·30, width pronotum (just anterior to humeri at widest point) 0·70; length mesonotum 0·15, width 0·80; a very minute fore femoral spine present, length fore femur 0·50, width 0·18, length hind tibia 0·63, hind tarsal segment lengths I 0·22,

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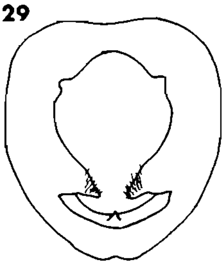

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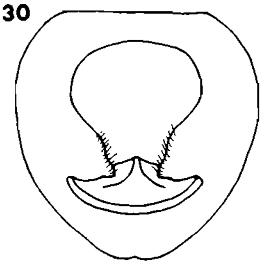

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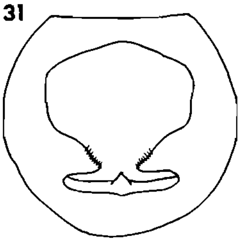

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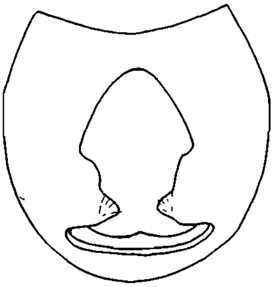

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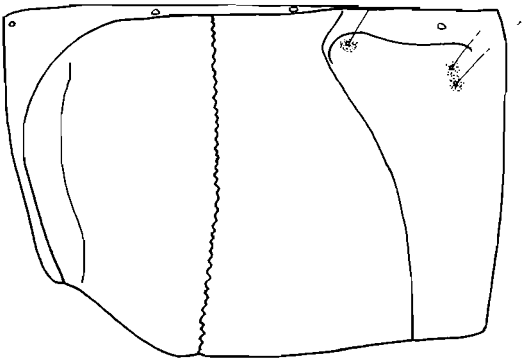

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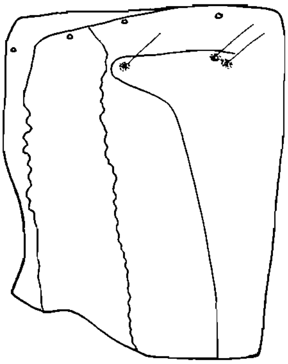

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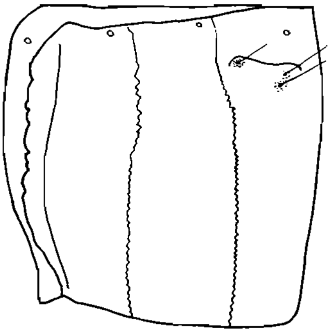


Figs. 29–32. Dorsal view of genital capsules (anal sclerites removed). 29. *Notiocola riebeecki*. 30. *N. emlembei*. 31. *Capenicola tafelbergiensis*. 32. *Tasmanicola truganinae*.

Figs. 33–35. Anterior sterna, lateral view. 33. *Tasmanicola truganinae*. 34. *Bathydema socia*. 35. *Capenicola tafelbergiensis*, lateral view.

II 0·18; Y-suture present, abdominal sclerites similar to those of instar 3, width between scent gland orifices 3–4 0·15, 4–5 0·13, 5–6 0·13; width of abdomen 1·13, length 1·15, total length 1·90.

First Instar (alcohol)

Head, antennal segments 1, 2, and 3 light yellow brown, antennal segment 4, abdominal sclerites, thoracic nota and pleura brown, legs and labium pale brown, abdomen irregularly light yellow-orange, dark red-orange between abdominal scent glands; head, pronotum, mesonotum and antennae densely covered with long erect setae longer than width of antennae, metanotum, abdomen and legs with short erect setae; head subcylindrical to antenniferous tubercles with barely protruding eyes, one long, one short eye seta, 20 facets present, epicranial arms straight, stem present, length head 0·37, width across eyes 0·37, interocular distance 0·28; antennal segment 1 terete, 2 and 3 cylindrical, 4 fusiform, length antennal segments I 0·18, II 0·22, III 0·16, IV 0·35; labium reaching 2nd abdominal segment, length labial segments I 0·18, II 0·22, III 0·18, IV 0·24; pronotum quadrate, little narrowed anteriorly, convex above, especially across anterior margin, lateral margins ecarinate, length pronotum 0·18, width pronotum 0·49; mesonotum a thin ecarinate strap, length 0·08, width 0·53, metanotum composed of two widely separated quadrate plates that narrow mesally; pleura with dorsal margins rounded; legs of moderate length, fore femora hardly incrassate, mutic, length 0·30, width 0·14, length hind tibia 0·35, length hind tarsal segments I 0·18, II 0·17; abdomen without a Y-suture, anterior scent gland located equidistant from anterior and posterior end of abdomen, scent gland sclerites relatively large, distance between orifices 3–4 0·12, 4–5 0·12, 5–6 0·11, length scent gland sclerites 3–4 0·04, 4–5 0·04, 5–6 0·02, small mesal sclerites present on tergum 9 and sterna 8 and 9, width of abdomen 0·62, length 0·67, total length 1·34.

Egg (fig. 49)

Relatively short, cylindrical, with dorsal side convex, ventral side slightly concave, apical end rounded, slightly flattened in centre, posteriorly tapering to a rounded end, at late eye spot stage embryo largely yellow with conspicuous red eye spots and red area around scent gland region, chorion transparent smooth, 5–6 very short indistinct micropylar processes present in pentagonal or hexagonal arrangement at centre of anterior end, egg diameter greatest (0·24) just anterior to midline, length 0·51.

Notiocola hutchinsoni, new species (fig. 4)

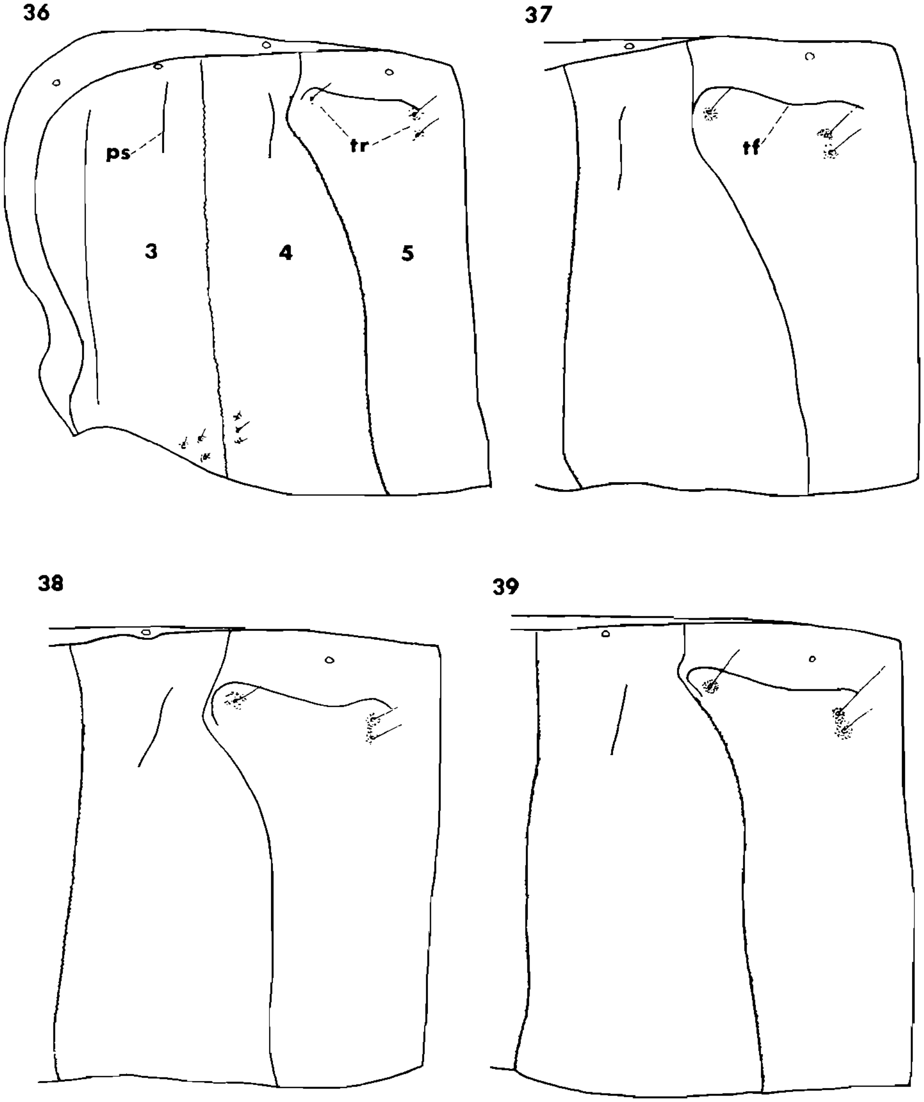
General coloration light reddish brown, becoming darker on anterior pronotal lobe, shading to light testaceous in area of humeri; scutellum reddish brown laterally, nearly uniformly dark chocolate brown mesally; clavus chocolate brown, postcubitus pale testaceous; corium variegated, mottled, ground colour a dull red-brown, explanate lateral margins with exception of distal ¼ pale yellow, a light testaceous stripe along radial vein interrupted by a dark dash at level of distal end of claval commissure, an ovoid testaceous spot in inner angle of apical corial margin, and a pale testaceous dash along basal ½ of cubital vein, remainder of distal ½ of corium dark chocolate brown, basal area lighter, membrane conventionally smoky grey-brown with strongly contrasting pale veins; legs and antennae reddish brown, the latter becoming testaceous on segments 2 and 3, fore femora obscurely darkened to fuscous on distal $\frac{1}{3}$; clothed above with scattered but conspicuous semi-erect hairs, these particularly prominent laterally on pronotum, on scutellum and distal $\frac{1}{2}$ of clavus; pronotum coarsely punctate before calli and over entire posterior lobe.

Head porrect, not extending anteriorly midway to distal end of 1st antennal segment, eyes relatively very large and protrudent, head grooves between ocelli prominent, length head ·70, width head ·98, interocular space ·48; pronotum unusually broad across humeri, lateral margins sinuate, a conspicuous median depression on posterior lobe, area of calli with shallow broad impressions at posterior margin, posterior margin of pronotum straight or very feebly concave, length pronotum 1·0, width pronotum 1·72; scutellum conspicuously transversely furrowed, length scutellum ·92, width scutellum ·90; hemelytra with lateral corial margins strongly explanate, evenly convex, only slightly tapering posteriorly, radial vein strongly raised throughout entire length, distance apex clavus—apex corium 1·44, distance apex corium—apex membrane ·96; membrane completely developed, slightly exceeding posterior margin of abdomen; abdomen (fig. 38) with spiracles 2 and 4 hidden under epipleura, pseudosutures present on 3 and 4, suture between sterna 4–5 curving slightly anteriorly around (not joining) trichobothrial furrow, attaining connexival margin, intersegmental sutures between sterna 3 and 4 finely crenulate; length labial segments I ·74, II ·64, III ·62, IV ·40; antennae elongate, very slender, clothed with elongate upstanding hairs which are longer than antennal width, intermixed with semi-decumbent hairs, 4th segment very narrowly fusiform, length antennal segments I ·64, II 1·10, III ·74, IV ·78; total length 5·72; phallus (figs. 14–15) with gonoporal process thick, sclerotized, of 6 turns with 'scoop-shaped' apex, helicoid process modified into a slender appendage on vesica, apex of conjunctiva with sclerotized irregular ring, holding sclerites small, pointed, shorter than body, phallotheca with dorsal and ventral-lateral area desclerotized; parameres as in fig. 25; genital capsule opening without notches, parandria broad, almost square, with caudal corner rounded and caudal margin carinate; spermatheca (fig. 42) with spherical bulb, duct short, more than twice length of bulb, apically expanded nearly as wide as bulb, narrow distal rim present.

Holotype: ♂ SOUTH AFRICA: Cape Province, Elgin Forest 10.III.1954. (L. Vari). In Transvaal Museum, Pretoria.

Paratypes: 1 ♂ SOUTH AFRICA: Cape Province, Tradouw's Pass, 850 ft, 20 miles WNW. of Swellendam, 15 November 1967 (M. H. Sweet). 1 ♀ same data as holotype. In J. A. Slater and M. H. Sweet collections.

This is the largest species of *Notiocola* and is most closely related to *N. quathlamba*. It agrees with the latter in possessing almost identical coloration on the clavus and corium and in having elongate antennae with upstanding hairs on the 2nd and 3rd segments. The present species, however, may be distinguished from *quathlamba* by the distinctive genitalia (figs. 14, 15) and by the relatively much larger eyes which may be expressed as the ratio of the width across the eyes relative to the interocular space which in the present species is 2·07, and in *quathlamba* is 1·75. Furthermore, there are a number of subsidiary characters which will separate the two species, although they tend to be relative and difficult to use unless specimens of both species are at hand. *N. hutchinsoni* has more elongate hairs on the pronotum, clavus and corium than does *quathlamba*. The depression medially on the posterior pronotal lobe and the 'thumb-like' imprint depressions along the posterior margin of the thoracic calli all are deeper and more distinct in *hutchinsoni* than they are in *quathlamba*. Furthermore, the general coloration of the head, pronotum and scutellum of *hutchinsoni* is reddish brown, whereas in *quathlamba* it tends to be nearly piceus and of a much less reddish coloration. *Quathlamba* is also appreciably smaller, males averaging 4·63 in *quathlamba* and 5·72 in *hutchinsoni*, females 5·09 and 6·16. The three known specimens of *hutchinsoni* are all macropterous, whereas the entire series consisting of 20 indi-



Figs. 36–39. Anterior sterna of species of *Notiocola*, lateral view. 36. *riebeecki*. 37. *quathlamba*. 38. *hutchinsoni*. 39. *emlembei*. ps, pseudosuture; tf, trichobothrial furrow; tr, trichobothria.

viduals of *quathlamba* from the Sani Pass are very slightly brachypterous. This character frequently is helpful in delineating species where wing polymorphism is present. While very frequently in brachypterous species an occasional macropter will be found, it is extremely rare to find species with wing polymorphism where macropters predominate over brachypters. Therefore, since both *hutchinsoni* and *emlembei* (where a very long series is available) are known only in the macropterous condition, it seems highly unlikely that brachypterous specimens occur.

This species is dedicated to Dr John Hutchinson of Kew Gardens, England, for his extensive contributions to the botany and biogeography of southern Africa.

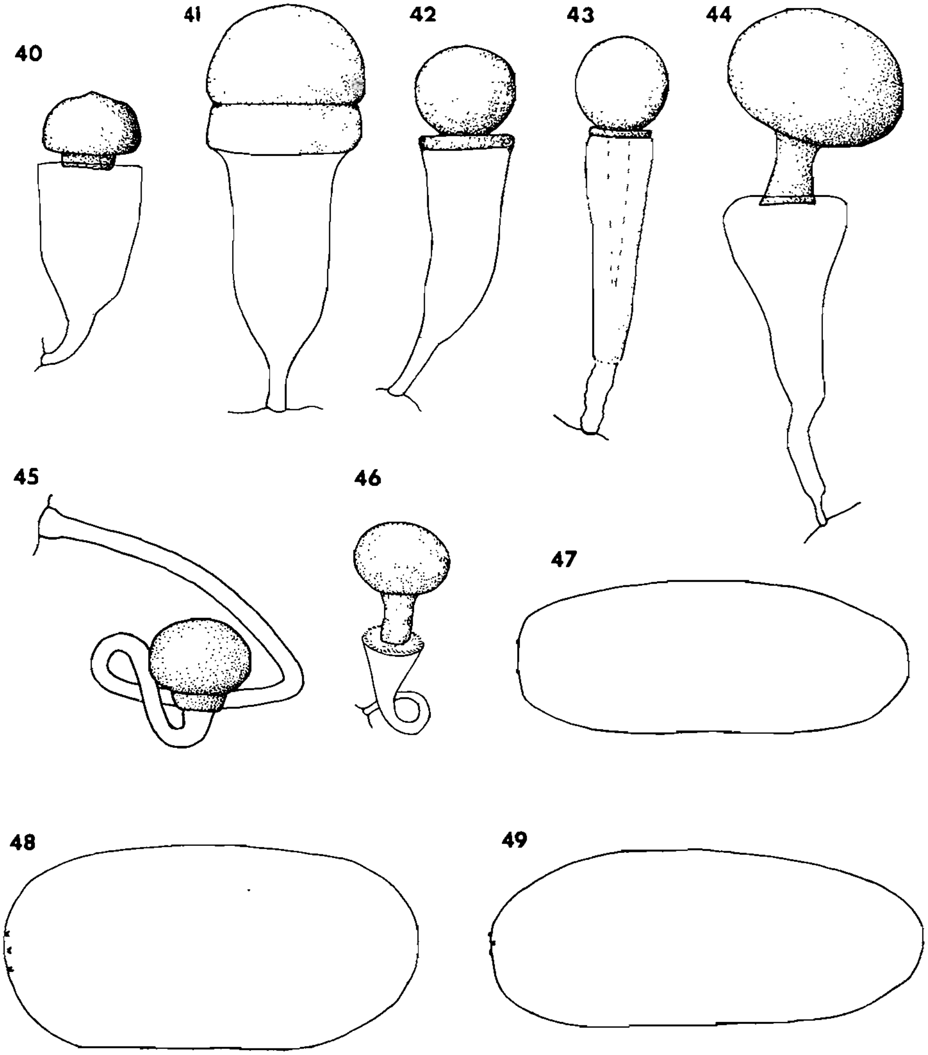
Biology

One male of *hutchinsoni* from Tradouw's Pass was collected on a steep slope in natural, partly burnt, Cape Macchia vegetation, in a small moist microhabitat pocket formed by a slight rock overhang. It was the only specimen found in 6 hours searching. Other rhyparochromine species (*Lasiosomus* sp., *Plinthisus* sp. and others) which were abundant in the adjacent sunny areas were not present in this moist microhabitat. Other apparently-suitable moist shaded areas were inhabited by *Eremocoris africanus* Slater and *Lasiosomus* sp. In the laboratory the insect lived for three months and fed on seeds of *Erica* sp. and *Helichrysum sesamoides* (L.) Willd. from the natural habitat and on sunflower seeds. It did not feed on grass seeds (*Pentaschistis stendelii* (Ness) McClear) from the habitat.

Notiocola emlembei, new species (fig. 1)

General coloration bright reddish ferruginous, becoming yellowish to testaceous on pronotal humeri; hemelytra predominantly testaceous, black markings relatively reduced, consisting only of an obscure mark on distal $\frac{1}{3}$ of clavus, apical corial angle and a large irregular spot between radial and cubital veins just proximad of the pale oval macula adjacent to apex of claval commissure, remainder of corium light testaceous, general coloration paler than in *quathlamba* and *hutchinsoni*; vestiture very reduced on dorsal surface, extremely short scattered inconspicuous upstanding hairs present, giving appearance of a glabrous or semi-glabrous surface overall; coarsely punctate before and behind calli with slight indication of punctures along median line in area of calli, punctures between inner and median claval puncture rows numerous, 20 or more in number.

Head reaching to or beyond middle of first antennal segment, relatively elongate, eyes less prominent than in *hutchinsoni*, relatively more elongate, length head ·76, width head ·82, interocular space ·46; pronotum strongly tapering anteriorly with lateral margins conspicuously sinuate, humeri slightly produced, pronotal calli less prominent than in related macropters, with indications of punctures separating calli into two distinct portions, median depression on posterior lobe very shallow and obsolete, posterior margins of calli less strongly impressed than in related species, posterior margin of pronotum straight or nearly so, length pronotum ·90, width pronotum 1·50; scutellum with transverse grooves relatively shallow, length scutellum ·80, width scutellum ·76; hemelytra conventional, lateral corial margins almost straight until near apex of claval commissure, then gently evenly convexly tapering, membrane slightly exceeding apex of abdomen, completely macropterous, distance apex clavus—apex corium 1·20, distance apex corium—apex abdomen ·78; length labial segments I ·66, II ·68, III ·62, IV ·42; antennae slender, terete, possessing a number of elongate hairs on segments 2 and 3, these considerably longer than the width of the segments, length antennal segments I ·59, II 1·03, III ·76, IV ·80; total length 7·80; abdomen (fig. 39) with two pseudosutures on sterna 3 and 4 below spiracles, spiracle 2 hidden under epipleura; suture between sterna 4 and 5 curving slightly anterior around but not joining trichobothrial furrow, attaining connexival margin, intersegmental sutures between segments 3 and 4 and 4 and 5 finely crenulate; length labial segments I ·66, II ·68, III ·62, IV ·42; antennae slender, terete, possessing a number of elongate hairs



Figs. 40–46. Spermatheca. 40. *Capenicola tafelbergiensis*. 41. *Notiocola riebeecki*. 42. *N. hutchinsoni*. 43. *N. elembei*. 44. *N. quathlamba*. 45. *Paracnemodus capensis* Slater. 46. *Bathydema socia*.
Figs. 47–49. Eggs, lateral view. 47. *Capenicola tafelbergiensis*. 48. *Notiocola riebeecki*. 49. *N. quathlamba*.

on segments 2 and 3, these considerably longer than the width of the segments, length antennal segments I ·59, II 1·03, III ·76, IV ·80; total length 7·80; phallus (figs. 16–17) with thick sclerotized gonoporal process of 7 turns with terminal turns open and apex broad and blunt-pointed, helicoid process modified into oval flap at end of membraneous vesica, apex of conjunctiva with lateral curved sclerotized band, holding sclerites very slender, broadest at attachment with seminal chamber, sclerotized band with pointed apex around sperm duct at base of seminal chamber; genital capsule with no notches, parandria broad, expanding caudad to round apex; paramere as in fig. 26; phallotheca with dorsal apical area desclerotized, venter with two lateral desclerotized sinuses; spermatheca (fig. 43) with bulb on narrow sclerotized distal rim of expanded duct, rim narrower than bulb, duct about three times length of bulb with semi-sclerotized distal $\frac{3}{4}$, basal $\frac{1}{4}$ membraneous; ovipositor with apex rounded, hairs along shaft and four long setae on each gonopophysis.

Holotype: ♂ SOUTH AFRICA: Transvaal, 22 mi. S. of Barberton, el. 4,900 ft, 24 March 1968 (T. Schuh, J. A. & S. Slater, M. Sweet). In National Collection of Insects, Pretoria.

Paratypes: 59 ♂, 57 ♀, same data as holotype. In J. A. Slater and M. H. Sweet collections.

This species is completely macropterous. It may readily be separated from *N. hutchinsoni* by its genitalia (figs. 14–17, 25–26, 42–43) and by the extremely short inconspicuous hairs on the dorsal surface in contrast to the elongate prominent hairs in the latter species. Furthermore, *emlembei* has much smaller less protrudent eyes (figs. 1, 4) which may be expressed as the ratio of width of head to interocular space, which in *emlembei* is 1·78 and in *hutchinsoni* is 2·04. This species also is a much paler species than *hutchinsoni* or *quathlamba*, although possessing the same general pattern of coloration on the hemelytra as these two latter species. The pronotum, however, in the very long series before us, is almost uniformly reddish ferruginous in contrast to the dark chocolate brown to almost black coloration of these other two species.

From *riebeecki*, to which it is related by the extremely short vestiture and the reddish brown coloration, this species can immediately be distinguished by the elongate hairs on the second and third antennal segments, the much coarser punctures on the pronotum, and by the considerably larger number of punctures between the inner and median claval puncture rows, of which this species possesses twenty or more, and *riebeecki* only five or six. Furthermore, the corial colour of *riebeecki* is predominantly reddish, and in this species it is a variegated testaceous yellow, black and rufescent.

Biology

The highlands south of Barberton at an elevation of 4,900 feet support an outlier Cape Macchia vegetation with temperate forests in the kloofs. *N. emlembei* was found under a dense closed stand of a tall heath (*Erica drakensbergensis* Guth. and Bol.) 5 to 9 feet tall which was flowering but not producing seeds at that time. No herb layer was present and the ground was covered with a thick mull leaf litter on a deep porous soil rich in humus. The habitat was wet from recent rains, but the shade canopy and soil condition indicated that this is normally a cool moist habitat. The insects were found under the leaf litter and in the soil spaces in an estimated intensive abundance of about 110–120 per square metre.

Also abundant but less so at 60–80 per square metre was *Cligenes* sp. On the sunnier margins of the *Erica* stands species of *Lasiosomus*, *Eremocoris* and a genus near *Salaciola* were present with *Cligenes*, but *Notiocola* was absent. Several pairs of *Notiocola* were found *in copulo* in the field. Despite the cool conditions *Notiocola*, much like *Ozophora* (Sweet 1964), readily took flight briefly ('flitted') when disturbed.

In the laboratory, as is true for other species of *Notiocola*, the insects proved delicate and died in a few days in petri dish cultures. They remained alive somewhat longer if a thick layer of moist litter was provided. The insects survived for a few weeks on sunflower seeds and oviposited before dying. The eggs were laid in crevices in the litter and were not adhesive. Under dry conditions the eggs shrivelled in a few days, but if kept moist or near water developed to late eye spots (katatrepsis) but did not hatch.

Notiocola madagascariensis, new species

General coloration variegated dark red-brown and testaceous, head very dark brown, strongly shining, pronotum a contrasting dull subpruinose testaceous on the anterior collar and along the slightly explanate lateral margins and as a pair of large quadrate longitudinal patches on either side of midline, remainder of pronotum including entire calli, a narrow median stripe on posterior lobe and a broad lateral band encompassing humeral areas a dark red-brown; scutellum dark red-brown basally, two pale bars laterad, entire apical fourth black; hemelytra largely testaceous with a median longitudinal dark stripe, a broad dark patch along lateral corial margin slightly caudad of middle; otherwise lateral area of corium laterad of and including radial vein pale testaceous with a small apical dark patch, membrane conventionally smoky grey with veins paler; legs nearly uniformly bright red-brown, somewhat darker on apical portion of femora; antennae bright yellowish tan, 1st segment somewhat darker, 3rd and 4th segments with distal half strongly contrasting black; sparsely clothed above with rather elongate upstanding hairs, antennae with only moderately elongate hairs, the majority decumbent, hairs of antennal segment 2 at most only very slightly longer than antennal width, head smooth, very minutely punctate, pronotum, scutellum and hemelytra coarsely punctate, with punctures present even over disc of calli, these punctures usually further apart than their own diameter.

Head porrect, extending anteriorly midway along 1st antennal segment, vertex moderately convex, length head ·66, width head ·76, interocular space ·41, pronotum rather evenly narrowing from humeral angles to anterior margin, lateral margins sinuate with a narrow but distinct explanate margin, a shallow longitudinal median furrow on posterior lobe, and a slight but evident impression laterally behind calli, length pronotum ·88, width pronotum 1·40; scutellum somewhat depressed mesally, lateral areas slightly elevated, length scutellum ·72, width scutellum ·68; hemelytra with clavus possessing 9 to 10 punctures between inner and mesal puncture rows, postcubitus slightly elevated and calloused, corium with lateral margins slightly sinuate and expanded from near apex of scutellum to apex of corium, membrane complete, reaching at least to posterior margin of abdomen, distance apex clavus—apex corium ·94, distance apex corium—apex abdomen 1·0; abdominal sternum strongly shining; antennae relatively stout for genus, 3rd segment slightly enlarged on distal $\frac{1}{3}$, 4th evenly fusiform, length antennal segments I ·66, II ·78, III ·62, IV ·40; labium elongate, exceeding metacoxae, 1st segment slightly exceeding base of head, length labial segments I ·40, II ·73, III ·56, IV ·80; fore femora moderately incrassate, armed below with a single spine on distal $\frac{1}{3}$; total length 4·68.

Holotype: ♂ MADAGASCAR Est.: District Sambava, Marojejy, Matsabory, 2,030 m, XII–58 (Raharizonina). Institute Sciéntifique Madagascar. Specimen deposited in Paris Museum.

This striking species is very easily distinguished from any of the South African species by the black distal half of the 3rd and 4th antennal segments which contrast strikingly with the testaceous or reddish tan colour of the basal half. It is a large species resembling *N. hutchinsoni* in size, but more prominently marked than any of the South African species. The lateral pronotal margins are also narrowly explanate although not sharply carinate in this Madagascar species. The apical third of the scutellum is black, and the variegated pale and dark corial markings are quite prominent.

The presence of this genus in Madagascar is, we believe, further evidence of the antiquity of the genus and its central place in the evolution of the Y-suture rhyparochromine stocks. It should be noted that like the South African species *emlembei* and *quathlamba* this species occurs at high altitudes in the mountains. Mr Stuckenberg (*in litt.*) informs us that Marojejy is one of a few mountains in Madagascar which are so high as to rise well above the limit of the forest and have on their summits well developed pseudo-ericoid, tropico-alpine heath-like vegetation. This flora is macchia-like through convergence in morphological features and only to a secondary degree through taxonomic relations. It may well be that like the flora *madagascariensis* will ultimately prove to be convergent with the South Africa species of the genus through lowland forms but there is no evidence of this at the present time. It is important to realize that the habitat of this species appears to be similar to that in which the South African species occur.

The somewhat explanate pronotal margins and the shining abdominal sternum might seem to indicate that the species is transitional between the South African species and that from Tasmania. We believe, however, that the relationship is primarily with *Notiocola* and place the species in this genus.

Capenicola, new genus

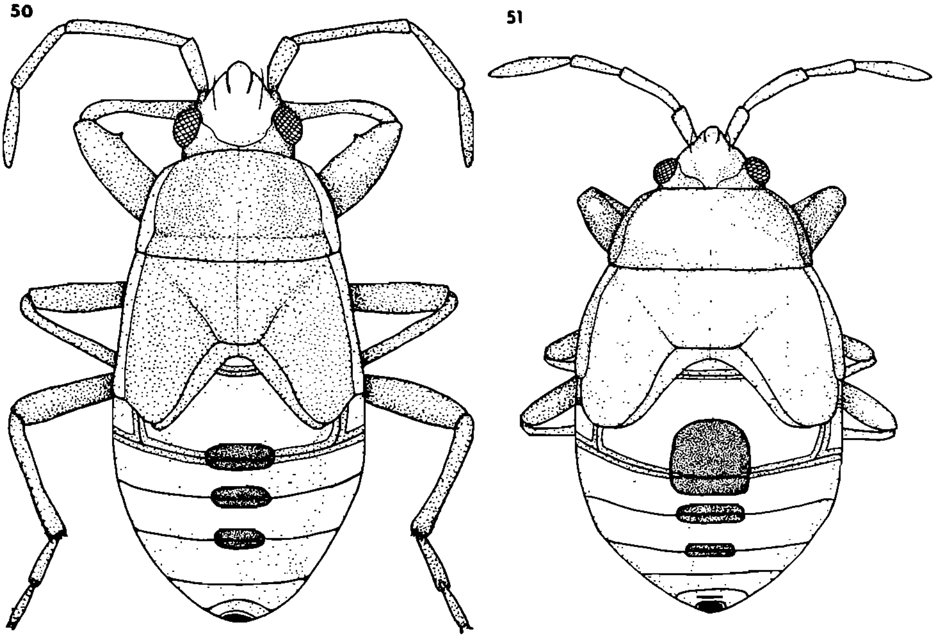
Head and pronotum both shining, body completely non-pruinose; ocelli small, set close to eyes; head somewhat declivent; pronotum with lateral margins distinctly carinate, non-explanate, area of calli not appreciably raised above remainder of dorsal surface, posterior pronotal margin slightly elevated in a calloused ridge; clavus with 3 distinct rows of very large coarse punctures, postcubitus raised and calloused, clavus and corium distinct, membrane reduced to a narrow strip along apical corial margin, not extending caudad of apex of corium; metathoracic scent gland orifice with dorsal callus extending caudodorsal; abdomen with spiracles ventral, inner laterotergites present on terga 3 to 6, suture between sterna 4 and 5 nearly straight, attaining connexival margin (fig. 35), no pseudosutures present beneath spiracles on sterna 3 and 4, posterior pair of trichobothria on segment 5 directly beneath spiracle; fore femora slender, little incrassate, armed below on distal $\frac{1}{3}$ with a single small spine; antennae stout, terete, hairs of uniform length subequal to width of segment; phallus (fig. 22) with gonoporal process thick and heavily sclerotized, narrow helicoid process present, a single pair of large holding sclerites present, paramere (fig. 27) small with apical hook slightly curved, parandria of genital capsule narrow (fig. 31); spermathecal bulb with basal neck present, duct short, greatly expanded distally (fig. 40); nymph (fig. 51) with abdomen deep red, Y-suture present, scent gland sclerites large, lateral margin of pronotum and wing pads narrowly and opaquely explanate.

Type species: *Capenicola tafelbergiensis* new species. Monobasic.

Capenicola tafelbergiensis, new species (fig. 5)

General coloration reddish brown, becoming testaceous on pronotal humeral angles and posterior margin of pronotum, basal and apical portions of clavus, base, lateral area and suffused areas of corium; head dark red-brown, becoming paler on tylus; calli, scutellum, a patch on clavus adjacent to apex of scutellum, an elongate irregular band mesad of the radial vein of the corium, and extreme apical corial margins dark red-brown to nearly black; legs nearly uniformly testaceous; antennae very dark brown piceus to black, 1st segment pale tan except for apical $\frac{1}{3}$; body surface appearing nearly glabrous, actually bearing very short setigerous hairs arising from punctures, these more conspicuous laterally on pronotum; dorsal surface slightly rugulose on head, with pronotum, scutellum and hemelytra very coarsely punctate, these punctures large, deep and at least over posterior $\frac{1}{2}$ of pronotum set closer to one another than diameter of puncture.

Head relatively elongate, extending to or beyond middle of 1st antennal segment, no evidence of head furrows between ocelli, eyes prominent, elongate, length head ·40, width head ·58, interocular space ·36; pronotum quadrate, very little broader across humeri than across area of calli, dorsal surface strongly and prominently convex and rounded, lateral pronotal margins sinuate, transverse impression obsolete, posterior margin very shallowly concave, area of calli smooth, or with very obsolete punctures, strongly contrasting with heavily punctate areas before, laterad to, and behind calli, posterior margins of calli very lightly impressed midway between meson and margin, length pronotum ·60, width pronotum ·88; scutellum weakly rugulose and heavily punctate, very slightly depressed basally, lacking a distinct median elevation on distal $\frac{1}{2}$, length scutellum ·44, width scutellum ·50; hemelytra with claval commissure well developed, length claval commissure ·44, corium strongly depressed laterad of radial vein so that disc of hemelytra from radial vein mesad to claval suture is flat, but laterad of this area sloping strongly to lateral margin which is narrowly explanate, apical corial margin bluntly rounded, leaving 5th, 6th and 7th abdominal terga exposed, distance apex clavus—apex corium ·32, distance apex corium —apex abdomen ·50; metathoracic scent gland orifice narrow, generally slender from base to apex, evenly curving posteriorly; pseudosutures not visible in adult abdomen (fig. 35) (present in nymph); posterior trichobothrial pair of segment 5 located below and slightly posterior to spiracle, spiracle in posterior $\frac{1}{3}$ of segment, 0·07 from posterior margin (in female, trichobothrial pair is slightly *anterior* to spiracle!), intersegmental suture between sterna 4 and 5 nearly straight, bending slightly cephalad at level of trichobothrial furrow, intersegmental sutures between sterna 3 and 4 and 4 and 5 coarsely crenulate; labium slightly exceeding mesocoxae, length labial segments I ·34, II ·33, III ·28, IV ·26; antennae relatively slender, 1st segment somewhat clavate, 2nd and 3rd segments evenly terete, 4th segment narrowly fusiform, length antennal segments I ·28, II ·40, III ·32, IV ·40; total length 2·62; phallus (fig. 22) with gonoporal process thick and sclerotized, of $2\frac{1}{2}$ turns,



Figs. 50–51. Fifth instar nymphs, dorsal view. 50. *Notiocola riebeecki*. 51. *Capenicola tafelbergiensis*.

a thin translucent flange running along process, thin helicoid process of ¾ turn present at apex of membranous vesica, holding sclerites large, apical ends pointed, basal end with small strut attaching wing to seminal chamber, wings very large, curved around and nearly covering seminal chamber, parandria of genital capsule (fig. 31) relatively narrow, bluntly pointed; spermatheca (fig. 40) with distal sclerotized bulb hemispherical with pointed apex and basal neck present, spermathecal duct short, membranous, three times length of bulb, distally greatly expanded and wider than bulb, no apical sclerotized rim on bulb; ovipositor with apex rounded, each gonapophysis bearing two apical long setae.

Holotype: ♂ SOUTH AFRICA: Cape Province, Cape Town, Table Mt., Western Table, 3,500 ft, 7 December 1967 (M. H. Sweet). In National Collection of Insects, Pretoria.

Paratypes: 10 ♂, 10 ♀, same data as holotype—3 ♂, 6 ♀, same data except 12 October 1967. In National Collection of Insects, Pretoria, Cape Town Museum, J. A. Slater and M. H. Sweet collections.

Biology

Capenicola was found only in one small area on the western end of the south facing slope of Table Mountain near the collection site of *Notiocola riebeecki* n. sp. The area is a small shelf that lies just below the level of the Table Mountain plateau, and is thus protected from the drying winds sweeping the summit and receives rain runoff from the western table. As a result of this topographic situation the shelf supported a moderately tall (3–5 feet) Macchia shrub formation. *Capenicola* was restricted to the litter under one 3-foot high clump of heath (*Erica glophyra* Killick) with some *Metalasia muricata* (L.) Don.

(Compositae) admixed. The litter was 2–3 inches deep and quite moist. The soil was thin and stony, but moist with seepage.

The insects were most abundant at the base of the plant where at 1.30 p.m. the litter temperature was 61°F., illumination 130–500 f.c., contrasting with the open sun-exposed area where the ground temperature was 114°F., illumination 8000 f.c. and the litter dry. The insect population was limited to litter under 82°F. (air temperature at two feet 83°F.). Only *Cligenes* sp. (intensive abundance 50/m^2) was found with *Capenicola*; other rhyparochromine species (*Plinthisus* sp., *Lasiosomus* spp.) occurred on the drier outskirts of the clump. On 12 October 1967, the population consisted of 85% adults, 15% fifth instars with the intensive abundance of 10/m^2. 7 December 1967, the abundance was 25/m^2 with adults and nymphs present in the observed frequencies: adult 52%, 5th instar 18%, 4th 16%, 3rd 7%, 2nd 7%.

In the laboratory the insects survived well and fed on *Erica*, peanut and sunflower seeds. Often the hard ovary *Erica* was drilled through to the seeds within. No eggs were laid between 12 October and 5 November, after which oviposition commenced. The eggs were laid in wet cotton substrate. The eggs hatched and the nymphs developed through to adults by 10 December.

All adults, both from the field and laboratory rearing, were brachypterous as are most of the "Macchia" rhyparochromines, which attests to the permanency of this habitat. *Capenicola* will probably prove more widespread, occurring in more mesic protected areas of Table Mountain, as the western table is particularly barren and windswept.

Descriptions of Nymphs

Fifth Instar (alcohol) (fig. 51)

Head, thoracic and abdominal sclerites shining dark brown, appendages brown, with tarsi, antennal segment 4 and apices of femora paler; abdomen cherry-red with extreme connexival margins paler; body and appendages thinly covered with short semi-decumbent pale hairs, 1 pair of long setae (head trichobothria) present on vertex of head, a single short seta present on interior surface at base of antennal segment 1; head subtriangular from above, moderately porrect, vertex slightly convex, epicranial stem short (0·05), normally hidden under pronotum, eyes with about 100 facets, moderately protuberant and nearly in contact with anterior margin of pronotum, length head 0·28, width across eyes 0·58, interocular distance 0·35, preocular distance 0·28, length antenniferous tubercles 0·08; antennae with segment 1 exceeding tylus by ½ its length, antennal segment 1 terete, slightly bent, segments 2 and 3 barely terete, nearly cylindrical, segment 4 fusiform, thickest (0·08), length antennal segments I 0·22, II 0·30, III 0·25, IV 0·38; labium attaining metacoxae, length labial segments I 0·30, II 0·33, III 0·25, IV 0·22; pronotum with wing pads with lateral margins narrowly explanate and opaque, pronotum quadrate, narrower across anterior corners than across humeri, slightly convex above, bent strongly down from level of mesonotum, lateral margins slightly convex, tapering anteriorly, narrow posterior lobe weakly marked off by a transverse line, length pronotum 0·43, width across humeri 0·90; wing pads with lateral margins slightly convex, length mesothoracic wing pads 0·88, width 1·15; legs relatively short, fore femur incrassate, armed ventrally with small moveable spine, length 0·50, width 0·18, hind tibia slightly curved, without movable spines, length

0·65, length tarsal segments: I 0·20, II 0·30; abdomen with Y-suture, evaporating sclerites surrounding scent gland orifices broad, especially anterior one, distance between scent gland orifices 3–4 0·38, 4–5 0·25, 5–6 0·24; length sclerites 3–4 0·30, 4–5 0·11, 5–6 0·10; mesal sclerites present on terga 8 and 9 and sterna 7, 8, and 9, sclerite on 7 largest; each pair of lateral trichobothria surrounded by a relatively large sclerite, posterior pair of trichobothria on segment 5 directly beneath and slightly anterior to spiracle, spiracle of segment 4 closest to connexival margin, pseudosutures present below spiracles on lateral sides of segments 2, 3, and 4, width of abdomen 1·10, length 1·15; total length 2·23 (female 2·43).

Fourth Instar (alcohol)

Coloration and investiture similar to instar 5 except thoracic sclerites not so dark; wing pad not quite attaining abdomen; length head 0·25, width across eyes 0·53, interocular width 0·35; length antennal segments I 0·18, II 0·22, III 0·20, IV 0·30; length labial segments I 0·22, II 0·25, III 0·19, IV 0·15; length pronotum 0·33, width across pronotal humeri 0·78; length mesothoracic wing pad 0·38, width 0·94; fore femoral spine present, length fore femur 0·43; length of hind tibia 0·53, length tarsal segments I 0·15, II 0·15; length abdomen 1·03, width 0·96; total length 1·97.

Second Instar (alcohol)

Head, thoracic sclerites and appendages subshining grey-brown, abdominal sclerites dull brown, abdomen orange-red; sparsely and evenly clothed with pale semi-erect hairs; length head 0·13, width across eyes 0·33, interocular width 0·22; antennae relatively short, segment 1 terete, 2 and 3 subcylindrical, 4 fusiform, length antennal segments I 0·11, II 0·11, III 0·10, IV —; labium reaching abdominal segment 3, length labial segments I 0·16, II 0·12, III 0·12, IV 0·14; pronotum relatively short and wide, lateral margins very narrowly explanate, length 0·18, width across humeri 0·51, length mesonotum 0·08, width 0·56; length hind tibia 0·25, hind tarsal segment lengths I 0·07, II 0·12; abdomen relatively broad (0·61), length 0·49; total length 0·99.

Egg (fig. 47)

Chorion smooth, shining, with 3–4 very short (0·005) apical chorionic processes arranged in an even triangle or square around apical pole of egg, distance between processes 0·02, egg "cucumber" shaped with slightly concave ventral side, cephalic end slightly thicker than caudal end, width egg 0·35, length 0·80.

Tasmanicola, new genus

Head non-declivent, porrect, shining, contrasting strongly with pruinose but non-iridescent pronotum and hemelytra; lateral pronotal margins sharply and acutely carinate, calli contiguous mesally, impunctate except on midline, posterior lobe prominently and irregularly punctate, transverse impression obsolete, posterior margin straight; scutellum with a shallow median impression, lacking a carina; clavus with three distinct rows of punctures, an irregular field between inner and median rows; postcubitus and corium as in *Notiocola*; epipleura carinate, non lamellate; abdominal venter shining, suture between abdominal sterna 3 and 4 and 4 and 5 crenulate, the latter curving strongly anteriorly, spiracles of sterna 2, 3 and 4 hidden under epipleura; fore femora slender, little incrassate, armed below on distal ⅓ with a single sharp spine; hind tibiae with fine soft hairs only, lacking 2 rows of movable spines on outer surface, antennal segments 2 and 3 slender, terete, segment 4 narrowly fusiform, segment 1 exceeding apex of tylus by approximately ½ its length; inner laterotergites present on segments 3–6; suture between abdominal sterna 3–4 attaining lateral margins (fig. 33); posterior pair of trichobothrial hairs on segment 5 located one above the other and located just posterior to spiracle; phallus with a long fine gonoporal process, helicoid process of 2–3 turns present as are holding sclerites.

This genus is extremely closely related to *Notiocola*, agreeing in most respects with the latter and differing chiefly in the acutely carinate lateral pronotal margins, shining abdominal sterna, a fine rather than thickened gonoporal process, and a more coiled and developed helicoid process.

The presence of a primitive stygnocorine in Tasmania is of great zoogeographic importance. Not only does it point strongly to the possibility of a former land connection with Africa, but it also explains rationally the occurrence of *Margareta* in New Zealand.

Type species: *Tasmanicola truganinae* new species. Monobasic.

Tasmanicola truganinae, new species

General coloration testaceous, interspersed with irregular dark brown markings over dorsal surface, head bright red-brown, extreme apex of tylus yellow, pronotal calli light ferruginous; corium with a dark brown patch at apical angle and as a stripe extending ½ way to base from angle at apex of claval commissure, a large light brown patch adjoining this stripe and extending laterally slightly beyond radial vein; membrane smoky hyaline with dark brown stripes and patches interspersed between veins; antennae pale yellow with distal ⅔ of 4th segment strongly contrasting dark brown; legs pale yellow with basal ⅓ to ½ of femora bright red-brown and with a brown band on middle and hind femora near distal end (this very obscurely represented on fore femora as well); appearing nearly glabrous above with very short inconspicuous hairs present arising from punctures.

Head with eyes large, prominent, ovoid, occupying most of lateral head surface, in or nearly in contact with anterior pronotal margin, ocelli located much closer to eye than to midline, length head ·62, width head ·78, interocular space ·42; pronotum with lateral margins nearly evenly tapering from humeral angles to anterior margin, very faintly sinuate, calli smooth, convex, a double line of punctures present along midline, otherwise impunctate, area anterior to and laterad of calli coarsely punctate, anterior lobe nearly as long as posterior lobe, the latter irregularly and prominently punctate over entire surface, length pronotum ·80, width pronotum 1·30; length scutellum ·64, width scutellum ·60; length claval commissure ·64; corium with radial vein strongly elevated and nearly carinate on basal ½, lateral margins explanate, strongly broadened and arcuately rounded caudad of posterior end of claval commissure, distance apex clavus—apex corium ·80, distance apex corium—apex abdomen ·86; membrane attaining posterior end of abdomen; scent gland orifice slender, sharply angled caudo-laterally on distal ½; labium extending between mesocoxae, length labial segments I ·44, II ·44, III ·36, IV ·32, first tarsal segment of fore legs not or little longer than segments 2 and 3 combined; length antennal segments I ·36 (from paratype), II ·72, III ·60, IV ·60 (paratype); total length 4·06; phallus with long fine gonoporal process ending in a 'saucer-shaped' interweaving coil, no sclerotized lobes on surface of conjunctiva and vesica, holding sclerites attached to seminal chamber (= sperm reservoir) by a narrow process, wings ovoid (fig. 18), phallotheca completely sclerotized, paramere (fig. 28) with a short 'hook' and a carina running from base of shank to 'hook'.

Holotype: ♂ TASMANIA: Frankfort, 'moss' (A. M. Lea) 6365, 1904–245. In British Museum (Natural History).

Paratype: 1♂, same data as holotype (but spelled 'Frankford'). In J. A. Slater collection.

The close resemblance of this species to members of the genus *Notiocola*, the climate of Tasmania, and the collection record from moss all indicate that the species will probably prove to be adapted to living in a cool, relatively damp environment.

We take pleasure in naming this species after the last Tasmanian aborigine to survive.

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